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# Economic Implications of Agricultural Policy Reforms in Industrial Market Economies

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**ECONOMIC IMPLICATIONS OF AGRICULTURAL POLICY REFORMS IN INDUSTRIAL MARKET ECONOMIES**. By Vernon O. Roningen and Praveen M. Dixit, Agriculture and Trade Analysis Division, Economic Research Service, U.S. Department of Agriculture. Staff Report No. AGES 89-36.

## Abstract

The authors used an 11-region, 22-commodity world net trade model to study the economic implications of agricultural policy reform in industrial market economies. Their analysis shows that elimination of protectionist agricultural policies would drive up world prices for most commodities and that the increases would be closely related to the levels of government assistance. The results also indicate that the United States would improve its agricultural balance of trade, while the European Community and Japan would face considerably larger trade deficits. All three economies, however, would experience income gains from multilateral liberalization, though, on a per capita basis, these gains would be small.

**Keywords**: multilateral trade liberalization, agricultural policy reform, producer subsidy equivalent (PSE), consumer subsidy equivalent (CSE), net trade models, SWOPSIM, economic welfare.

## Acknowledgments

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- Even though assistance to agriculture is high in Japan, its policies do not have much influence on international prices because it is not a major participant in world agricultural markets. The only exception to this is the rice market. Japan's policies effect world rice price more than the combined effects of all other industrial countries.

**Effects on World Trade**

- Agricultural trade for most commodities would expand if industrial market economies simultaneously liberalized their trade. The largest increases would be in rice and sugar trade. World wheat trade would decline modestly because of the elimination of export subsidies.

- The United States would improve its agricultural balance of trade by $3 billion. Most of this improvement comes from decreases in beef import costs and increases in grain export revenues because of rising world prices.

- The EC and Japan would face considerably larger agricultural balance-of-trade deficits, while developing countries on the aggregate would lower their import costs by nearly $6 billion.

**Effects on Domestic Production and Incomes**

- Multilateral elimination of support would reduce production of most agricultural commodities in industrial market economies. The decline in production for a liberalizing country would be more under unilateral liberalization than under multilateral liberalization.

- Producers in the United States, EC, and Japan are likely to lose between $15 and $25 billion with multilateral trade liberalization unless they are compensated. Most of the losses in the United States would occur because of the elimination of government assistance to producers. Rice producers in Japan, ruminant meat producers in the EC, and grain producers in the United States account for most of the losses. World price increases would not be sufficient to offset the lost support.

- While the losses in producer incomes may appear large, such losses would be even greater if those countries undertook the same type of policy reform unilaterally. U.S. producer losses would be cut by over two-fifths under multilateral liberalization, while losses in the EC would be a third less. This suggests that if producers are to be compensated during the transition to freer trade, the payment required would be much less under multilateral reform. Producers in Japan would lose about the same under either condition.

**Effects on Economic Welfare**

- For every dollar that producers lose because of multilateral liberalization, consumers gain much more. Consumers and taxpayers in industrial market economies gain $1.42 in transfers for every dollar lost by

producers. The transfer gains are slightly lower for the United States but greater for the EC and Japan.

- Multilateral liberalization would generate income gains of about $6 billion for Japan, $9 billion for the United States, and $14 billion for the EC. On a per capita basis, New Zealand would gain the most.

- The welfare implications for developing countries are rather complex. While developing exporters like Argentina and Brazil would benefit from rising world prices, developing countries that are net food importers could experience welfare losses because of the rising costs of imports.

# Economic Implications of Agricultural Policy Reforms in Industrial Market Economies

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## Introduction

Government intervention in the agricultural sector is pervasive in nearly every country in the world. These interventions often take the form of policy measures such as price and income supports, supply controls, and barriers to trade or export incentives, and appear to have significantly distorted the location of production and trade. While these distortionary measures were not a source of major concern in the 1970's when international agricultural trade grew rapidly, a world recession in the early 1980's changed the picture considerably. Growth in the global consumption of agricultural products slackened, while production kept expanding in response to technological advances and continued assistance to agriculture in developed countries. Many exporting countries were left holding large surpluses of commodity stocks, and escalating costs of domestic farm programs became even more worrisome. Global expenditures on domestic farm programs nearly doubled during the first 5 years of the 1980's. In 1986 alone, the United States and the European Economic Community (EC) each spent nearly $25 billion on farm programs. Competitive efforts to dump the surplus in shrunken world markets made the situation worse, depressing international commodity prices, exacerbating the farm crisis globally, and creating trade tensions among countries.

Tensions were especially high between the United States and the EC. Each accused the other of using unfair trade practices to bolster exports, particularly grain exports. The risk of an international farm subsidy war increased even further when the enlargement of the EC to include Spain and Portugal sharply reduced future prospects for United States corn and sorghum sales. EC offers of compensation were considered inadequate, and the United States threatened retaliation against EC food and beverage sales. The EC responded with threats to counterretaliate against U.S. exports of rice and corn gluten feed (Paarlberg, 1988).[1]

The United States and the EC were not the only countries embroiled in a trade dispute. Canada, upset over high deficiency payments to U.S. corn producers, imposed countervailing duties on imports of U.S. corn. The Australians, angered over U.S. and EC trading practices, coalesced 13 self-proclaimed nonsubsidizing countries into the Cairns Group of Fair Traders in Agriculture. The risk of a farm trade war was clearly increasing.

The possibility of escalating this conflict, combined with increased budgetary costs to support protectionist farm policies, brought agriculture to the top of the international economic policy agenda. At the September 1986 Minis-

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1. Complete citation in References.

terial Meeting of the General Agreement on Tariffs and Trade (GATT) held in Punta del Este, Uruguay, an agreement was reached to give agriculture the highest priority in the next round of multilateral trade negotiations (MTN). The Ministerial Declaration (GATT, 1986) that launched a new round of international trade negotiations (the Uruguay Round) emphasized the "urgent need to bring more discipline and predictability to world agricultural trade by correcting and preventing restrictions and distortions ... so as to reduce the uncertainty, imbalances and instability in world agricultural markets." The declaration also drew up three broadly stated objectives: improve market access through the reduction of import barriers, increase discipline on the use of all subsidies and other measures affecting agricultural trade, and minimize the adverse effects that health and sanitary regulations can have on agricultural trade.

The United States, in July 1987, presented its proposal for the Uruguay Round calling for member countries to completely phase out over a 10-year period all policies that distort agricultural trade. The Cairns group later tabled a similar proposal. In October 1987, the EC put forth its two-stage proposal to manage exports of major internationally traded commodities in surplus and to gradually reduce support to agriculture while maintaining the broad features of the Common Agricultural Policy (CAP).[2]

Negotiations in agriculture are likely to be difficult and acrimonious. The process, however, could be made easier if negotiators have a good understanding of how government intervention in agriculture has affected world commodity markets. A number of studies have already been completed that attempt to document the potential economic implications of agricultural policy reform. This report adopts the methodology used by two such studies, the Organization for Economic Cooperation and Development's (OECD) Trade Mandate Study (OECD, 1987) and the World Bank's World Development Report 1986, to provide updated and more comprehensive answers to questions that may arise during the negotiations.

This report focuses on three specific issues: (1) how levels of assistance to agriculture compare across countries and commodity markets; (2) how assistance to agriculture in industrial market economies has distorted world production and trade, and which countries have contributed the most to these distortions; and (3) who would benefit from an elimination of assistance to agriculture in industrial countries.

The report begins by presenting empirical estimates of aggregate measures of support known as producer subsidy equivalents (PSE's) and consumer subsidy equivalents (CSE's). The report then provides a brief description and validation of the world agricultural net trade model used to address these issues. The distortionary effects on world agricultural markets arising from policies pursued by industrial market economies are described next. This follows with the quantification of economic costs associated with policies of individual market economies and the likely market effects of simultaneously eliminating such assistance. The report concludes with an assessment of the strengths and

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2. Additional information on the various GATT proposals can be found in Rossmiller (1988).

weaknesses of the analysis and conditions under which the potential economic implications could differ.

## Agricultural Support Profiles Across Industrial Market Economies

The policies and programs used to support agriculture are often complex and diverse across commodities and countries. A major practical step in understanding and quantifying these measures has been the development and acceptance of a measurement methodology in the form of producer and consumer subsidy equivalents. These measures allow the direct comparison of a broad range of policies within a simple measure (OECD, 1987).

A PSE is the level of subsidy that would be necessary to compensate producers for the removal of government programs affecting a particular commodity (Josling, 1981).[3] It represents the value of government support to producers but is not a measure of distortions in domestic or world trade. The PSE for a particular commodity is positive when the net effect of all programs affecting the commodity in a country is to increase the incomes of producers over what they would be in the absence of these programs, and negative when the net effect of all programs reduces incomes.[4] The PSE, in percentage form, allows comparison of support to producers across commodities and countries.

A CSE is the level of subsidy that would be necessary to compensate consumers for the removal of government programs. The CSE for a particular commodity is negative when the net effect of all programs affecting that commodity in a country is to increase the price consumers pay for food and positive when consumers pay less for food than they would in the absence of the program.[5] The CSE summarizes the extent to which support to producers is paid by an implicit tax on consumers through higher food prices.

PSE's and CSE's can be expressed in at least three ways (OECD, 1987, p. 104): as the total value of assistance to the commodity produced or consumed; as the total value of assistance per unit of the commodity produced and consumed; and

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3. The measurement methodology described by (Josling, 1981) implicitly assumes a small-country case where policies of a country cannot influence world prices.

4. The PSE's, as presently calculated, do not include forgone income resulting from policies that control supply, such as acreage reduction programs in the United States, or the effects of policies on intermediate product prices, such as the tax effect on the livestock sector caused by policies that raise feed prices. Suggestions have been made that PSE's be adjusted such that producers receive credit for supply control efforts already underway (Rausser and Wright, 1987 and McClatchy, 1988) as countries were given credit in previous GATT negotiations for unilaterally reducing tariffs.

5. The CSE estimates used in this report do not include subsidies such as U.S. food stamps or school lunch programs. Details on terminology and methodology used in estimating the PSE's and CSE's can be found in (USDA, 1987 and USDA, 1988). These same reports also provide comprehensive details on the limitations of the approach.

as the ratio of the total value of assistance to total receipts, which is value of production or consumption, including any direct net receipts. Table 1 shows the PSE and CSE levels for the base year 1986/87 by country or region for selected commodities using the ratio of assistance to total receipts. The weighted average PSE for all commodities indicates that, among the industrial market economies, Japan supports its producers the most, followed by other Western Europe (non-EC), the EC, Canada, and the United States (fig. 1). Australia and New Zealand have the lowest level of overall producer support among the industrial market economies.

Figure 2 compares the level of support for meats, dairy, and grains in the United States, EC, and Japan, the three major participants in the upcoming GATT negotiations. The illustration shows that the rates of support in all

Table 1--Producer and consumer subsidy equivalents by country or region and commodity groups, 1986/87

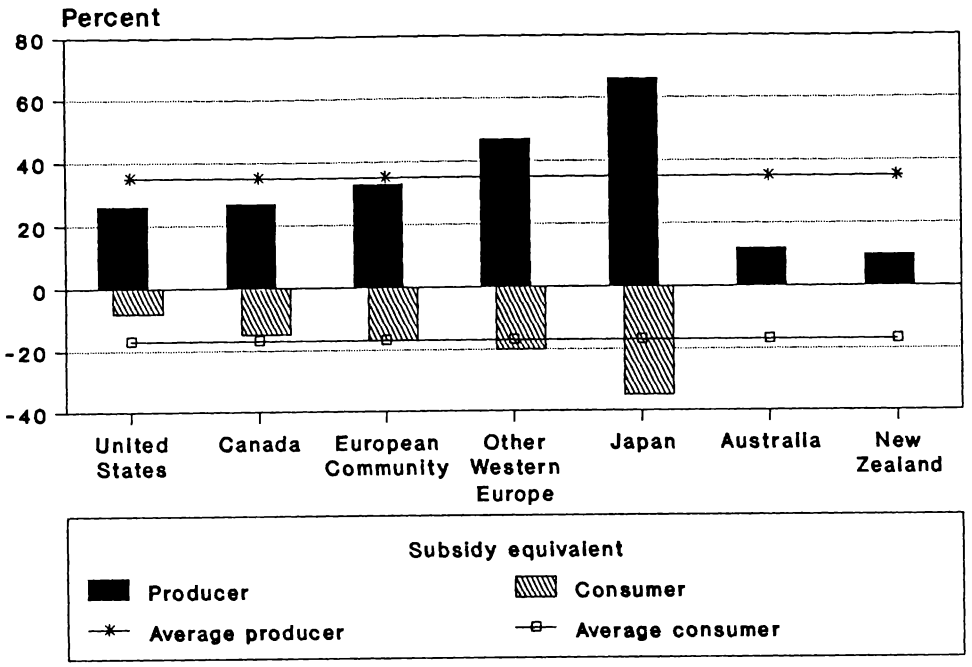
| Commodity group 1/ | United States | Canada | EC-12 | Other Western Europe | Japan | Aus-tralia | New Zealand | Average |
|---|---|---|---|---|---|---|---|---|
| | | | | Percent | | | | |
| Producer subsidy equivalent: | | | | | | | | |
| Ruminant meats | 11 | 10 | 40 | 50 | 66 | 4 | 8 | 29 |
| Nonruminant meats | 11 | 6 | 22 | 30 | 32 | 0 | 0 | 20 |
| Dairy products | 29 | 42 | 25 | 53 | 67 | 29 | 12 | 32 |
| Wheat | 59 | 40 | 59 | 52 | 91 | 15 | 0 | 55 |
| Coarse grains | 48 | 40 | 47 | 49 | 94 | 2 | 0 | 47 |
| Rice | 67 | 0 | 70 | 0 | 87 | 13 | 0 | 85 |
| Oilseeds and products | 7 | 13 | 28 | 0 | 20 | 0 | 0 | 14 |
| Sugar | 79 | 53 | 47 | 66 | 74 | 14 | 0 | 56 |
| Other crops | 33 | -21 | 50 | 0 | 0 | 1 | 0 | 35 |
| Average | 26 | 27 | 33 | 47 | 66 | 12 | 10 | 35 |
| Consumer subsidy equivalent: | | | | | | | | |
| Ruminant meats | -1 | -1 | -20 | -26 | -33 | 0 | 0 | -14 |
| Nonruminant meats | -2 | 3 | -15 | -23 | -19 | 0 | 0 | -9 |
| Dairy products | -15 | -35 | -14 | -14 | -42 | 0 | 0 | -17 |
| Wheat | -14 | -15 | -41 | -45 | -48 | 0 | 0 | -36 |
| Coarse grains | -12 | -1 | -42 | -45 | -15 | 0 | 0 | -27 |
| Rice | -4 | 0 | -36 | 0 | -72 | 0 | 0 | -69 |
| Oilseeds and products | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Sugar | -47 | -9 | -28 | -37 | -29 | 0 | 0 | -33 |
| Other crops | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average | -8 | -15 | -17 | -20 | -35 | 0 | 0 | -17 |

1/ Ruminant meats (beef, mutton, and lamb); nonruminant meats (pork, poultry meat, and eggs); dairy products (milk, butter, cheese, and powder); coarse grains (corn and other coarse grains); oilseeds and products (soybeans, soymeal, soyoil, other oilseeds, other oilmeals, and other oils); other crops (cotton and tobacco). Producer and consumer subsidy equivalent averages are weighted by base production and consumption values, respectively.

Source: (31, 34).

Figure 1

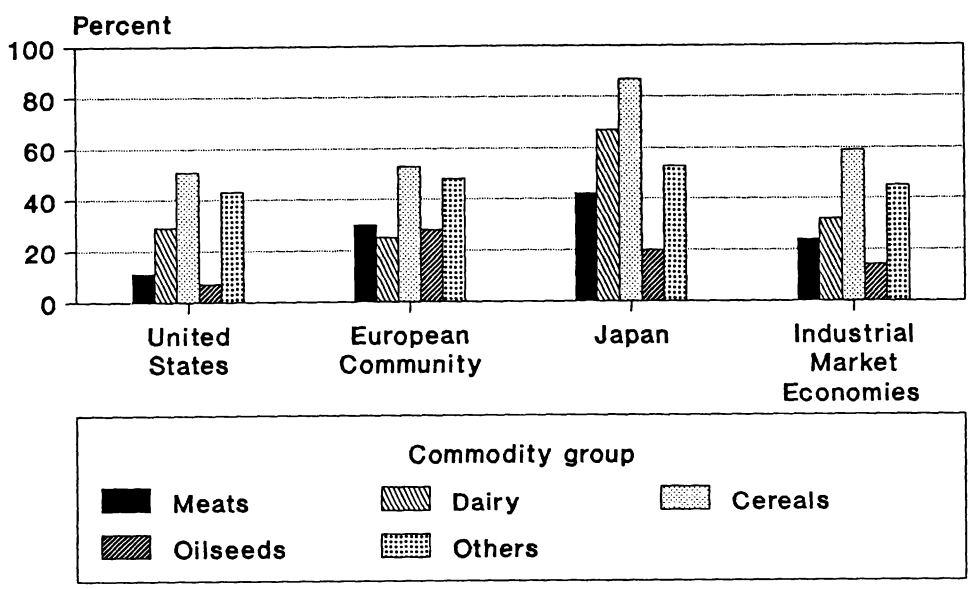
Average producer and consumer subsidy equivalents, industrial market economies, 1986/87




Source: (31, 34).

Figure 2

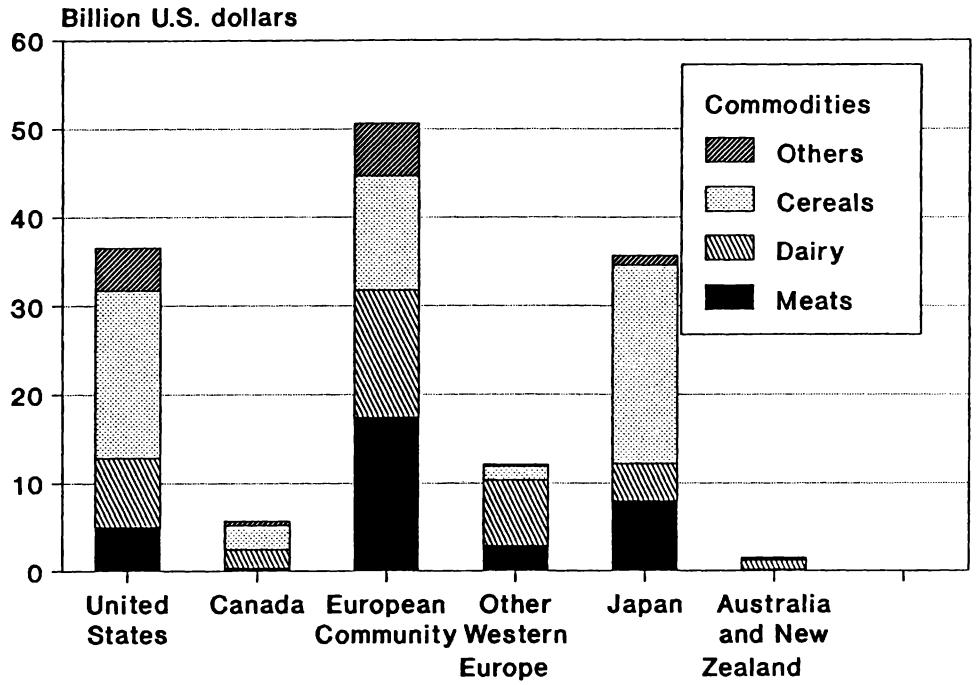
Producer subsidy equivalents by commodity groups for the United States, the European Community, and Japan, 1986/87




Source: (31, 34).

Figure 3

**Value of producer support by commodity groups in industrial market economies, 1986/87**




Source: (31, 34).

three regions were higher for cereal producers than those for dairy producers. Cereal support rates were similar in the United States and the EC but much higher in Japan. In addition, whereas dairy support rates were higher than those for meats in the United States and Japan, the converse was true for the EC.

Assistance to producers can also be compared across commodities within countries. Figure 3 shows the value of producer assistance in countries by broad commodity groups of meats, cereals, dairy, and other products. The share of assistance reflects both the size of the commodity sector in total production of commodities and the level of assistance. In Canada, Australia, and New Zealand, the dairy industry receives a large part of total assistance, while in the United States, the grains industry accounts for the largest share of total government support. The share of producer assistance is distributed more evenly among the commodity groupings in the EC. Nearly two-thirds of the government assistance in Japan goes to producers of wheat, rice, and coarse grains, even though the cereals sector accounts for only 40 percent of the total value of agricultural production.

The costs of support have to be borne either directly by domestic consumers through higher food prices or by taxpayers through increased government budgets. The distribution varies considerably among countries (fig. 4). In the EC and Japan, policies that artificially raise prices (tax)[6] to consumers

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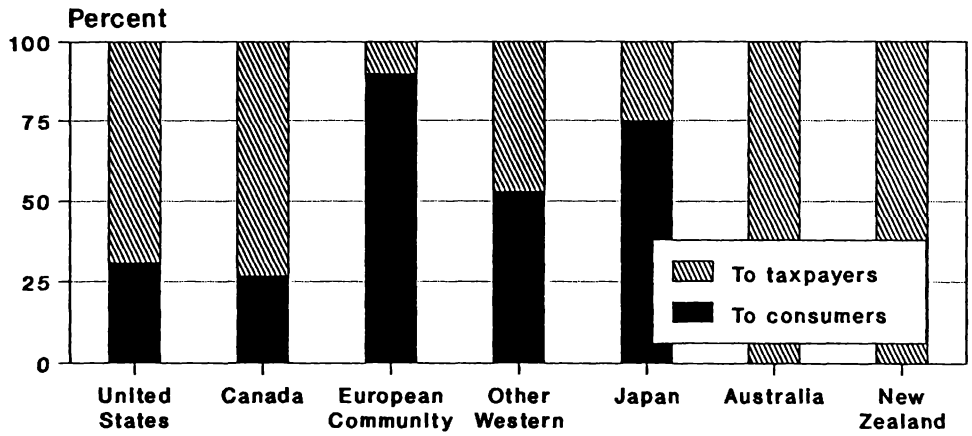
6. In the industrial market economies, the CSE's are mostly negative. For them, the CSE might almost as appropriately have been described as a

Figure 4

**Distribution of cost of producer support, 1986/87**




Source: (31, 34).

account for well over four-fifths of their support to agricultural commodities. Consequently, the CSE's are relatively high in those two regions. The United States, Canada, Australia, and New Zealand, however, maintain much less support through policies that transfer income from the consumer to the producer. Instead, these countries rely more on direct government budget support. The distortions in consumer prices, and, hence, the CSE's are therefore much lower.[7]

## The Model: Assumptions, Features, and Data Requirements

The analysis of the effect of agricultural support is done with the Static World Policy Simulation Modeling (SWOPSIM) framework (Roningen, 1986). A SWOPSIM model is characterized by three basic features: 1) it is a nonspatial price equilibrium model, 2) it is an intermediate-run static model that represents world agricultural markets for a given year, and 3) it is a multicom-

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consumer tax equivalent because policies there often have the effect of raising prices to consumers in a manner very similar to that of a sales tax. The balance of this report frequently refers to some policies as taxing consumers in this sense.

7. This difference in the source of producer support emphasizes how the structure of the support regimes in the EC and Japan differ from those of the developed country exporters. Countries that are traditional importers have an easier support option: they can tax the consumer directly by import tariffs or quotas and thereby avoid government budget exposure. Exporting countries tend to use government budget expenditures for support, since export taxes would lessen their competitiveness on world markets. Distortions in trade typically would be larger with policies that tax consumers because such policies affect both consumption and production. Depending upon how a country's policies operate, both levels of support and distribution of cost can vary with world market conditions.

modity, multiregion partial equilibrium model. To use this static, nonspatial equilibrium model to describe world agricultural trade, we make the following assumptions:

- o world agricultural markets are competitive in that countries operate as if they had no market power;
- o domestic and traded goods are perfect substitutes in consumption, and importers do not distinguish commodities by source of origin; and
- o a geographic region, though possibly containing many countries, is one marketplace.

SWOPSIM models are characterized by an economic structure that includes constant elasticity domestic supply and demand equations and summary policy measures (price wedges derived from PSE's and CSE's). Supply equations are functions of input or product prices, and if desired, other endogenous demand quantities (joint products). Demand equations are functions of own- and cross-product prices, and under certain circumstances, supply quantities of endogenous variables in the model. Trade is the difference between domestic supply and total demand (absorption) and, as such, does not permit separate identification of exports and imports in cases where a country is an exporter and importer of the same commodity.[8]

The policy structure is embedded in equations linking domestic and world prices. The standard policy structure is designed to allow flexibility in characterizing policies that may affect production, consumption, and trade. Policies are inserted as subsidy equivalents at the producer, consumer, export, or import level. In addition, price transmission elasticities can be used to characterize the degree of connection of domestic and world prices as world prices change. Exchange rates translate world trade prices to trade prices denominated in a country's domestic currency to link up with consumer and producer prices also denominated in the domestic currency. Details on the economic and policy structures inherent in the model can be found in (Roningen, 1986, Dixit and Roningen, 1986, and Roningen, forthcoming).

The version of SWOPSIM (ST86) that we use for this report is designed to represent the 1986/87 (base marketing year) world temperate and subtropical zone agricultural markets in intermediate-run equilibrium. In a static model like ST86, this means that all market participants (producers, consumers, traders) are assumed to have faced the prices and policies that actually existed in the base period for about 5 years and adjusted to them. The observed quantities produced, consumed, and traded in 1986/87 are, thus, assumed to be in an equilibrium that results after adjustment to 5 years of unchanged prices and policies. This assumption about the adjustment period enters the model through the selection of values for the supply, demand, and price transmission elasticities.

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8. Stocks are not explicitly modeled in the SWOPSIM framework because markets are assumed to be in intermediate-run static equilibrium. Implicitly, though, stocks are presumed to be proportional to consumption flows. If shorter run adjustment problems and alternative policies for transition are important, then there would have to be an explicit treatment of stocks.

Because ST86 is a synthetic model, we do not estimate elasticity parameters. Rather, we use parameters from other empirical studies to build the model. This procedure would typically imply a breach of theoretically valid behavioral relationships. We have attempted to overcome this limitation of synthetic models by imposing symmetry and homogeneity restrictions from demand theory to ensure consistency among own- and cross-price effects and restrictions based on multi-output production theory for modeling joint products (Haley, 1988). This procedure is similar to the application of theoretical constrains in computable general equilibrium models. However, we have closed only agricultural sectors of the economy, rather than the economy as a whole.

Twenty-two agricultural commodities, representing almost 90 percent of the total value of U.S. agricultural production, are included in the model: beef, pork, mutton, poultry, dairy including manufacturing milk, butter, cheese, and other dairy products, wheat, corn, other coarse grains, rice, soybeans and soybean products, other oilseeds and oilseed products, cotton, sugar, and tobacco. The model does not include tropical products, which account for a substantial portion of agricultural trade of developing countries. The world is divided into 11 regions: 7 represent the industrial market economies, 3 characterize developing countries, and 1 describes the centrally planned economies (CP's). Region and commodity composition and the mnemonics used in presenting results are shown in table 2.

The model constructed for this exercise contains summary support measures for all regions except the centrally planned economies. Commodity-specific price transmission elasticities which limit the passage of world price signals to their region, however, constrain the interactions of the CP's domestic sector with the world market. The CP's are assumed to have a price transmission of 0.2, indicating that only a fifth of the changes in world prices are transmitted to the domestic economy. A price transmission elasticity of 0.5 is used for all developing countries when the industrial market economies liberalize their policies.[9] For all industrial countries, a price transmission of 1 is used. This implies that any multilateral removal of support would also remove any insulation of domestic markets from world price movements.

Six types of data were required for each commodity in each country to construct ST86: supply, demand, and trade data for 1986/87: own- and cross-price elasticities of demand and supply; price transmission elasticities; technical coefficients such as feed conversion ratios; PSE and CSE data; and macroeconomic data such as exchange rates.

Supply, demand, and trade data were obtained from the U.S. Department of Agriculture's Foreign Agricultural Service, while exchange rate information was acquired from the International Monetary Fund's International Financial Statistics. The own- and cross-price elasticity estimates for demand and supply were based on a number of empirical studies. Details on it and the technical coefficients used in the model are presented in (Gardiner, Liu, and

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9. Very little information exists in the literature concerning price transmission elasticities for centrally planned economies and developing countries. The estimates we use are our best judgments based on studies presented in (Carter and Gardiner, 1988).

Table 2--Commodity and country coverage in ST86

| Product aggregates | ST86 detailed product coverage and mnemonic 2-letter codes |
|---|---|
| Ruminant meats | Beef and veal (BF), mutton and lamb (ML) |
| Nonruminant meats | Pork (PK), poultry meat (PM), eggs (PE) |
| Dairy | Milk (DM), butter (DB), cheese (DC), milk powder (DP) |
| Dairy products | Butter (DB), cheese (DC), milk powder (DP) |
| Wheat | Wheat (WH) |
| Coarse grains | Corn (CN), other coarse grains (CG) |
| Rice | Rice (RI) |
| Oilseeds and products | Soybeans (SB), soymeal (SM), soyoil (SO), other oilseeds (OS), other meals (OM), other oils (OO) |
| Sugar | Sugar (SU) |
| Other crops | Cotton (CT), tobacco (TB) |
| Farm products | Beef (BF), pork (PK), mutton and lamb (ML), poultry meat (PM), eggs (PE), milk (DM), wheat (WH), corn (CN), other coarse grains (CG), soybeans (SB), other oilseeds (OS), cotton (CT), sugar (SU), tobacco (TB) |
| **ST86 country or region** | **Database country coverage and TLIB mnemonic 2-letter codes 1/** |
| United States | United States (US) |
| Canada | Canada (CN) |
| European Community (12) | European Community-10 (EC), Spain (SP), Portugal (PT) |
| Other Western Europe | Other Western Europe (WE) |
| Japan | Japan (JP) |
| Australia | Australia (AU) |
| New Zealand | New Zealand (NZ) |
| Developing exporters | Brazil (BZ), Argentina (AR), Indonesia (DO), Thailand (TH), Malaysia (ML), Philippines (PH) |
| New industrialized Asia | South Korea (SK), Taiwan (TW), other East Asia (EA) |
| Centrally planned economies | Eastern Europe (EE), Soviet Union (SV), China (CH) |
| Developing importers | South Africa (SF), Mexico (MX), Central America and Caribbean (CA), Venezuela (VE), other Latin America (LA), Nigeria (NG), other Subsaharan Africa (AF), Egypt (EG), Middle East and North Africa, oil producers (MP) Middle East and North Africa, non-oil producers (MO) India (ND), other South Asia (OS), other Southeast Asia (SA), other Asia (OA), rest-of-world balancing world trade (RW) |

1/ TLIB is a 22-commodity 36-country or region database for 1984 and 1986, containing production, consumption, trade, price, and support data. Data from the TLIB database were aggregated according to the above regional groupings to form the ST86 model used for this report. Although the full TLIB database has been used as a large model, turn around time for model runs is much less if the model is aggregated to a regional level adequate to explore the research problem at hand.

Sources: Details on the TLIB database can be found in (Sullivan, Wainio, and Roningen, 1989). Information on aggregation and other model procedures and updates can be found in (Roningen, a forthcoming staff report further documenting the SWOPSIM model).

Roningen, 1989) while a discussion on the appropriateness of the selection of elasticities is treated in more detail later in this report. Information on price transmission can be found in (Sullivan and Liu, forthcoming), while data on PSE's and CSE's are given in (USDA, 1988).

Since PSE's reported in (USDA, 1988) do not incorporate costs of required supply control associated with farm programs, they, in effect, exclude some of the production-offsetting elements of policies. Such policies, therefore, are incorporated directly as volume shifters when modeling the sector. Additional information on supply management programs and their treatment in the modeling framework can be found in Appendix D and (Herlihy, Johnston, and Haley, forthcoming).

This report presents the results of experiments using the ST86 model in which new equilibrium solutions are obtained by removing PSE's and CSE's. The new solutions represent an approximation of the resulting adjustments in production, consumption, trade, and prices of agricultural commodities to be expected after 5 years, with the important proviso that all other conditions remain the same as in the base year, 1986/87. This permits the analysis to isolate and identify the differences between the new solution and the initial or reference solution that are attributable to the removal of distortionary policies.

## The Model: Validation and Properties

The reference solution in ST86 replicates the actual prices and quantities produced, consumed, and traded in the base year. This replication is not, however, evidence of a valid model. Rather, it only describes our system of initializing the model. A practical check of validity is to examine whether certain model properties appear reasonable.[10]

One such property that is of considerable interest is a measure of producer and consumer response to price changes. Table 3 presents aggregate supply and demand elasticities that reflect the variation of own- and cross-price elasticities for all regions in the model. In general, the parameters suggest that agricultural output in most industrial market economies do not respond greatly to changes in the level of agricultural prices over the medium term. The aggregate supply elasticities range between 0.35 and 0.5 for industrial countries and reflect the possibility of resources shifting slightly among several alternative outputs. This is consistent with constraints on inputs, like land, which would limit the aggregate response of farm sectors to price changes expected from trade reform. Among developing countries, the aggregate supply elasticities vary little, ranging from a low of 0.27 for the rest of the world importers to 0.33 for the newly industrialized economies of Asia that practice intensive agriculture. Aggregate demand elasticities are inelastic for both industrial and developing countries. Several other models, including those of the (OECD, 1987) and (Parikh, Fischer, Frohberg, and Gulbrandsen, 1988), obtain similar aggregate elasticities.

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10. No acceptable validation procedure exists for synthetic models. Validation, in our context, refers more to the reasonableness of certain parameters implied by the model.

Table 3--Aggregate supply and demand elasticities in ST86

| Country or region | Supply | Demand |
|---|---|---|
| United States | 0.37 | -0.37 |
| Canada | .35 | -.39 |
| European Community (12) | .37 | -.30 |
| Other Western Europe | .40 | -.29 |
| Japan | .50 | -.37 |
| Australia | .42 | -.35 |
| New Zealand | .40 | -.13 |
| Developing exporters | .30 | -.36 |
| Centrally planned economies | .22 | -.20 |
| New industrialized Asia | .33 | -.37 |
| Developing importers | .27 | -.36 |

Source: Calculated by the authors by weighting product supply and demand elasticities by production and consumption.

Partial net trade elasticities also provide some indication of the validity of the model. Table 4 gives the own-price partial net trade elasticities faced by the United States over the medium term. These partial elasticities were derived by exogenously increasing the world price for the particular commodity in the reference solution by 10 percent while holding all other prices fixed. We focused on the United States largely because of the availability of such information for comparative purposes.

The net trade elasticities for U.S. grain exports are -1.9 for corn, -4.2 for wheat, and -19 for rice. The wheat and corn estimates fall within the longrun bounds provided by (Gardiner and Dixit, 1987). The large estimates for rice reflects the small share of U.S. exports in world rice trade.[11]

The medium-term elasticity of export demand for U.S. soybeans is -1.0. This compares favorably to the Gardiner and Dixit longrun mean of -1.3. The elasticity estimates for most animal products are large, especially for nonruminant meats. Here again, these estimates reflect the small share of world animal products trade accounted for by the United States.

While comparing U.S. net trade elasticities may provide some indications of the validity of the model, it certainly is not foolproof. For one thing, we were unable to find empirical estimates of net trade elasticities for a number of commodities, including animal products, sugar, and tobacco. Moreover, even for those commodities for which estimates were available, there was little

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11. The estimates in table 4 are based on a price transmission elasticity of 1 for industrial market economies but 0.5 and 0.2 for developing countries and centrally planned economies, respectively. This suggests that the elasticity estimates are probably larger than those that exist with current policies in place but much smaller than those that would exist under a free trade environment.

Table 4--Own-price net trade partial elasticities for U.S. agricultural products implied by ST86

| Commodity group | Own price change | All price changes |
|---|---|---|
| Ruminant meats 1/ | 16.3 | 12.6 |
| Nonruminant meats | 44.6 | 29.6 |
| Dairy products | -52.0 | -37.3 |
| Wheat | -4.2 | -2.0 |
| Coarse grains | -1.9 | -.4 |
| Rice | -19.1 | -16.4 |
| Oilseeds and products | -1.0 | -.3 |
| Sugar | 10.3 | 8.7 |
| Other crops | -2.2 | -1.8 |

1/ Elasticities reported are those for the most important commodity within the commodity group: Ruminant meat (beef), nonruminant meat (pork), dairy products (butter), coarse grains (corn), and other products (cotton).

Source: Calculated by the authors as described in the text of the report.

consensus in the literature on the size of the parameters. Lastly, even though the U.S. estimates may appear reasonable, that does not necessarily ensure that we modeled the responses of other countries adequately, especially for those markets in which the United States does not play a major international role.

## Market Effects of Removing Assistance to Agriculture in Industrial Countries

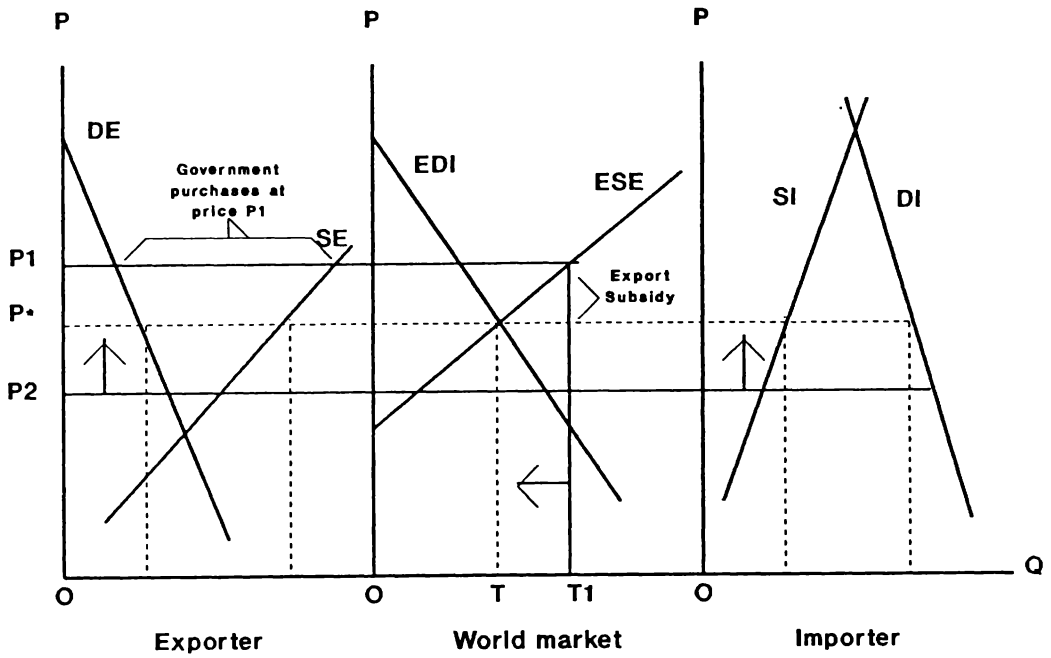
To understand the theoretical market effects of eliminating assistance to agriculture in developed countries, consider figure 5 which assumes a one-exporter one-importer, and one-commodity partial equilibrium world market. If there were no interventions in the markets, the equilibrium world price would be P*. At price P*, the excess supply in the exporting country would just equal excess demand in the importing country, and quantity OT would be traded.

Consider the case where the exporting country intervenes in its domestic markets and raises the domestic price to P1. At P1, the exporting country would be producing more but consuming less, increasing its excess supply. If the exporting country stockpiled this surplus, as the United States has done over the years, the world price could be maintained at P1. But over any length of time, the surpluses cannot be stored except at prohibitive costs. Under such circumstances, the exporting country may pursue a policy to dump the surpluses in the world market through the use of export subsidies, as is done by the EC. World prices would then fall to P2, and the level of assistance to producers in developed countries, as measured by PSE's, would be the difference between domestic and world price (P1-P2). World trade would expand to OT1 because of the use of export subsidies.

In the current market environment, exporting countries are intervening with a high domestic price, lowering the world price to P2. If they eliminated their

Figure 5

**Market effects of liberalizing trade in exporting countries**




support to agriculture, the removal of assistance (PSE's) would lower internal prices, curtailing domestic production and increasing consumption.

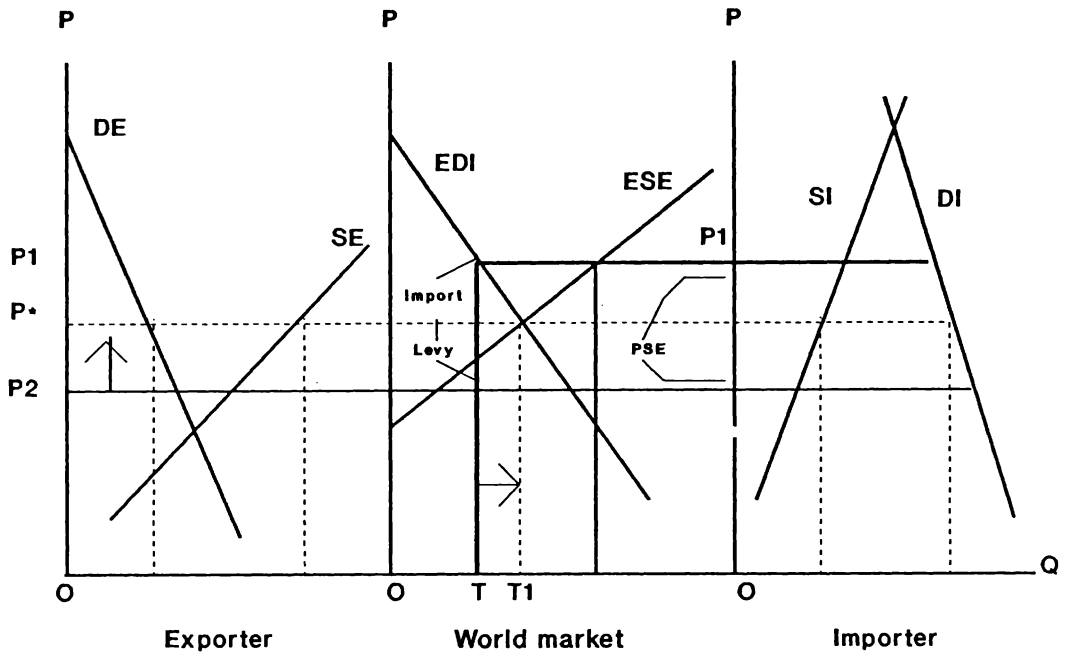
Aggregate demand would exceed aggregate supply in the world market, and the world price would rise to achieve equilibrium. World trade would fall to OT, and world price would increase to P*. The magnitude of the increase in world price (P*-P2) would be closely related to the level of support (P1-P2). The higher the level of support, the greater would be the increase in world price.

We just illustrated that in a one-commodity case with a subsidizing exporter, trade liberalization by the exporting country would increase world prices and contract world trade. This, however, need not be the case. If importing countries distort world trade through the use of trade barriers, as has been the case with Japanese beef imports, removal of protection could expand world trade and increase prices (fig. 6). The initial market environment is one where the importing country imposes import restrictions and limits world trade to OT at a world market price of P2. If the importing country was subsequently to remove its import levy, imports would increase and world trade would expand to OT1. World price, as before, would increase to P*.

Exporting and importing countries use a variety of measures that distort trade, with some expanding trade and others limiting trade. A priori, therefore, it is difficult to hypothesize the domestic and international effects of trade liberalization. Our study is designed to identify the market implications of agricultural policies pursued by a number of industrialized market

Figure 6

**Market effects of liberalizing trade in importing countries**




economies. We focus on two issues: the global market effects of multilateral trade liberalization by industrial market economies, and the contribution of each country's policies to current market conditions.

Two points need to be kept in mind in interpreting model results. First, our findings are based on a static model that assumes the new solution represents an equilibrium after about 5 years of adjustment, with all other conditions remaining the same. This means that our static results do not account for changes that may occur in a dynamic world economy even without the removal of government assistance. Hence, the results can only approximate the magnitude of changes that might be expected if only the factors varied in the model were operative. In reality, however, additional factors not covered in the model would also be varying over time and have additional important influence on the outcome. Increases or decreases implied by the model could, when translated into a real world environment, represent only expanded or reduced growth and not increases or decreases in absolute magnitudes. For instance, a production decline obtained from the model could be interpreted as a decline in the rate of increase in production that might occur because of secular growth trends.

Second, to identify a country's contribution to world market changes, we eliminate agricultural assistance in each country unilaterally, keeping the price transmission elasticity for all other industrial market economies at 1. This may not represent a realistic unilateral liberalization because a price transmission elasticity of 1 implies that other industrial countries do not insulate their domestic sectors from changes in the world market price but maintain their specific ($/metric ton) protection rates. However, to the extent that increases in world prices are considered desirable by governments in most industrial market economies, it seems reasonable to assume that they

would allow the world price effects to be translated to their domestic economies.

## Effects on World Prices

The estimated world price effects of liberalizing agricultural policies in some or all industrial economies are given in table 5. Our results suggest that world agricultural prices would, on average, increase by 22 percent if industrial market economies simultaneously eliminated all assistance to agriculture. The rise in world prices would be greatest for dairy products (65 percent), followed by sugar (53 percent). These large price increases occur because levels of assistance to dairy products and sugar in industrial countries are relatively high and industrial country trade is a major part of world trade. World prices for wheat (37 percent), rice (26 percent), coarse grains (26 percent), and ruminant meats (21 percent) would also increase noticeably for the same reasons. By contrast, world prices for oilseeds and products (6 percent) would increase only slightly, indicating that agricultural policies pursued by industrial countries have only had modest price-depressing effects on those commodities.

How meaningful is the roughly 20-percent increase in world prices that follows multilateral liberalization in terms of price behavior on world agricultural markets? The price change is equal to the average deviation in world prices in any particular year as a percentage of average prices over the past 20 years (fig. 7). It is much less than the average extreme deviation in world

Table 5-- World price effects of liberalization, 1986/87

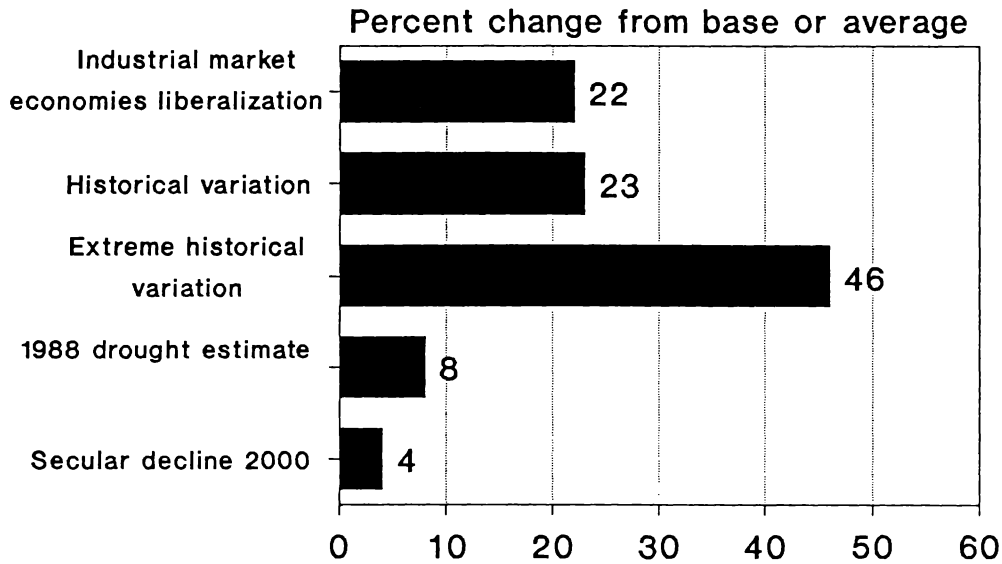
| Commodity group | Unilateral liberalization 1/ | | | | | | | Multilateral by industrial market economies |
|---|---|---|---|---|---|---|---|---|
| | United States | Canada | European Community (12) | Other Western Europe | Japan | Australia | New Zealand | |
| | Percent | | | | | | | |
| Ruminant meats | 3.8 | 0.4 | 13.5 | 1.5 | 1.8 | 0.2 | 0.2 | 21.0 |
| Nonruminant meats | 3.0 | .5 | 5.8 | 1.0 | 2.3 | .1 | 0 | 12.4 |
| Dairy products | 23.5 | 4.1 | 31.6 | 6.2 | 4.5 | .7 | .5 | 65.3 |
| Wheat | 10.6 | 4.1 | 19.1 | 1.6 | 2.5 | 1.6 | 0 | 36.7 |
| Coarse grains | 11.6 | 2.2 | 11.5 | 1.5 | .6 | .2 | 0 | 26.3 |
| Rice | 2.9 | .4 | 3.2 | .2 | 19.6 | .2 | 0 | 26.2 |
| Oilseeds and products | -2.6 | .5 | 7.9 | .2 | .4 | 0 | 0 | 6.4 |
| Sugar | 22.8 | .4 | 18.6 | 3.3 | 6.4 | 1.1 | 0 | 52.7 |
| Other crops | 4.0 | 0 | 3.3 | .1 | .7 | -.1 | 0 | 7.7 |
| Aggregate | 5.9 | 1.2 | 10.6 | 1.4 | 3.6 | .3 | .1 | 22.0 |

1/ Unilateral liberalization means that each country removed its support while others maintained theirs. Multilateral means all industrial market economies simultaneously remove their agricultural support.

Source: Results from SWOPSIM ST86 simulation by authors for this report.

Figure 7

**World price effects of industrial market economies liberalization in perspective**




Source: Calculated by the authors from SWOPSIM ST86 simulations, (27), and ERS and World Bank price data.

prices that occurred in the mid-1970's, but more than double the price effects of the 1988 drought. Furthermore, it overwhelms a secular decline in real prices that could occur up to the year 2000 if historical long-term trends continue.[12]

Thus, in historical terms the magnitudes are significant but not overwhelming. This means that historical experience with price changes is relevant both to the analysis of trade liberalization and to real world adjustment problems that might arise from that liberalization.

Our results also show that the EC and the United States are by far the most important contributors to the world price effects. Unilateral liberalization of agricultural policies by the EC would raise world agricultural prices an average of 11 percent (fig. 8). This is nearly half of the increase that would result if all industrial market economies simultaneously eliminated their support to agriculture. The price effects of EC policies are most

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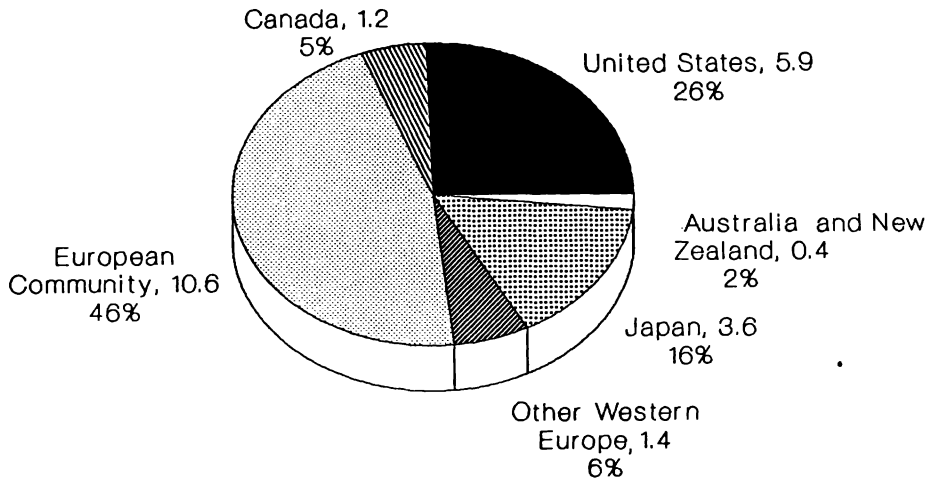
12. Variation in world prices is measured as a weighted average of coefficients of variation of ST86 reference prices from 1960/61 to 1984/85. The average extreme deviation is the weighted average of half the difference between minimum and maximum prices adjusted to the means of the respective commodity prices for the entire period. The 1988 drought estimates are ST86 price effects implied by U.S. and Canadian crop shortfalls (Washington Post, Aug. 12, 1988). The 4-percent secular decline is the result of an ST86 projection to the year 2000 and represents an ST86 interpretation of downward long-term real price trends (Roningen, Dixit, and Seeley, 1988).

Figure 8

**Contribution to world price changes, 1986/87**




Source: Results from SWOPSIM ST86 simulation by authors for this report.

visible in the dairy products, sugar, ruminant meats, and wheat markets. Our results indicate that if the EC were to unilaterally remove all assistance to agriculture, world prices for dairy products and wheat would rise by 32 and 19 percent, respectively. EC policies also appear to influence world coarse grain prices. Elimination of assistance to agriculture, mainly export refunds to barley and variable levies on corn imports, would raise world coarse grain prices by 12 percent.

Unilateral elimination of agricultural support policies by the United States would raise world sugar and coarse grain prices by 23 and 12 percent, respectively, equivalent to nearly half the increases in world prices from multilateral liberalization. These increases in world prices are consistent with our earlier observation that the sugar and grains sectors were the two most heavily supported sectors in the United States during 1986/87. Our results also indicate that U.S. policies are partly responsible for depressed world prices for wheat. U.S. liberalization alone would account for nearly a third of the increase in world prices for wheat that would accompany multilateral liberalization. By contrast, even though support to rice producers is highest among the grains, unilateral liberalization by the United States would have very little effect on the world rice price (3 percent) because U.S. shares of the world rice production and consumption are very small (1 percent).

An interesting inference from our results is that, despite similar rates of producer support, U.S. policies have had far less price-depressing effects in world grain markets than have EC policies. One reason for this is that U.S. consumer prices are not very distorted. Consequently, removal of support does not lead to increased quantity demanded. Another is that the distortionary implications of U.S. grain policies are moderated somewhat by set-aside programs, which have restricted acreage expansion that would have otherwise occurred with high domestic producer prices.

The success of these supply management programs, however, depends to a large extent on the effects on production from land set aside. The agricultural economics literature (Tweeten, 1979) seems to suggest that U.S. acreage set-aside programs have only been partially successful in controlling supply because of production slippage (Appendix E). Production slippage occurs if government supply management programs were to either draw more land into production than would otherwise be cultivated or if farmers were to increase their yield on cropped land in response to supply management programs. For this study, we assumed--based on empirical econometric estimates--that because of set-aside requirements, average yields on cropped lands were 2-10 percent higher and that 3 of 4 acres set aside come back into production. In a separate experiment, however, we assumed that U.S. set-aside policies were completely effective and no slippage occurred. Under those circumstances, we found that U.S. unilateral liberalization would increase world prices of wheat, coarse grains, and rice by 4, 4, and 1 percent, respectively, compared with the 11, 12, and 3 percent with slippage. U.S. set-aside programs would be almost trade neutral if production slippage did not occur.

Even though assistance to agriculture is high in Japan and non-EC Western European countries, policies in these countries do not have very much influence on international prices because these countries are not major participants in the world agricultural market. The only exception to this would be Japan in the rice market. Japan's policies affect world rice prices more than the combined effects of all other developed countries' policies. Policies of Canada, Australia, and New Zealand do not affect international prices very much because of their small size in world markets.

**Effects on World Trade**

One would expect that liberalization would increase specialization by countries because of their comparative advantage and lead to larger trade. Indeed, model results indicate that world agricultural trade volumes (table 6) for most commodities would expand when all industrial market economies liberalize simultaneously. The expansion is substantial for rice and sugar trade. Much of the expansion in sugar and rice trade results from liberalization by the United States and Japan, respectively. The elimination of production incentives leads to lower production and expanded imports for each commodity. Quantity traded of other agricultural commodities would also expand. World trade in oilseeds and oilseed products would increase by 14 percent and that for ruminant meats by 10 percent. Even though the proportionate increases in nonruminant meats and dairy trade are large, in absolute volume terms, these changes are rather small.

World wheat trade volumes would contract (20 percent) with multilateral liberalization. The increase in world price is not enough to compensate producers in industrial countries for the loss in government assistance, thereby leading to lower production and reduced exportable surpluses. This occurs despite the impetus for increases in U.S. wheat production, resulting from the release of land set aside under government programs. Trade in coarse grains would also decline, but by much less (5 percent).

Traditional food exporters like Australia and New Zealand would not only expand their exports of grains but would also increase exports of high-valued products like meats and dairy products. The United States, in contrast, would

Table 6--Trade balance changes from multilateral industrial market economies liberalization, 1986/87

| | United States | Canada | EC-12 | Other Western Europe | Japan | Aus-tralia | New Zealand | Devel-oping export-ers | Cent-rally planned econ-omies | New indust-rial Asia | Devel-oping import-ers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Million metric tons | | | | | | |
| Trade volumes: | | | | | | | | | | | |
| Ruminant meats | 1.1 | 0.1 | -1.9 | -0.2 | -0.4 | 0.2 | 0.1 | 0.4 | 0.1 | 0 | 0.5 |
| Nonruminant meats | .4 | .1 | -.9 | -.3 | -.5 | .1 | 0 | .2 | .5 | .1 | .3 |
| Dairy products | -.4 | -.1 | -.3 | -.2 | -.2 | .1 | .2 | .1 | .3 | 0 | .4 |
| Wheat | -3.0 | -.8 | -12.9 | -.7 | -.8 | 1.6 | .1 | 1.1 | 4.6 | .2 | 10.6 |
| Coarse grains | -8.3 | -3.2 | -5.0 | -1.0 | 3.9 | .4 | .1 | 3.0 | 1.9 | .2 | 8.1 |
| Rice | -.4 | 0 | -.6 | 0 | -8.9 | 0 | .1 | 2.0 | 1.0 | .1 | 6.8 |
| Oilseeds and products | 1.7 | .1 | -1.7 | .3 | .5 | 0 | 0 | -.6 | -.1 | -.1 | -.1 |
| Sugar | -3.4 | 0 | -1.5 | -.4 | -.8 | .5 | 0 | 1.8 | -.1 | .1 | 3.1 |
| Other crops | -.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .1 |
| | | | | | Billion dollars | | | | | | |
| Trade values: 1/ | | | | | | | | | | | |
| Ruminant meats | 2.5 | .2 | -4.8 | -.5 | -1.1 | 1.1 | .8 | 1.0 | .3 | 0 | .6 |
| Nonruminant meats | 1.0 | .1 | -1.1 | -.6 | -1.9 | .2 | 0 | .4 | 1.5 | .1 | .4 |
| Dairy products | -1.2 | -.3 | .1 | -.3 | -.8 | .6 | 1.6 | .1 | 1.0 | 0 | -.9 |
| Wheat | .7 | .7 | -1.4 | -.1 | -.4 | .9 | 0 | .1 | -.4 | -.2 | 0 |
| Coarse grains | .3 | -.2 | -.6 | -.1 | -.1 | .1 | 0 | .5 | 0 | -.2 | .3 |
| Rice | 0 | 0 | -.2 | 0 | -2.4 | 0 | 0 | .8 | .3 | 0 | 1.4 |
| Oilseeds and products | .4 | .2 | -.7 | .1 | 0 | 0 | 0 | .3 | .1 | 0 | -.2 |
| Sugar | -.9 | 0 | -.3 | -.1 | -.2 | .2 | 0 | .7 | -.2 | 0 | 1.0 |
| Other crops | -.1 | 0 | -.3 | 0 | -.1 | 0 | 0 | 0 | .1 | -.1 | .4 |
| Total | 2.8 | .7 | -9.1 | -1.8 | -7.0 | 3.2 | 2.4 | 3.9 | 2.5 | -.5 | 2.8 |
| | | | | | Percentage point change | | | | | | |
| Export shares: | | | | | | | | | | | |
| Wheat | 1.0 | 2.4 | -10.8 | -.3 | N/A | 4.6 | N/A | 1.3 | .9 | N/A | .9 |
| Coarse grains | -7.2 | -3.8 | 5.4 | -.4 | N/A | .6 | .1 | 3.3 | .8 | N/A | 1.3 |
| Rice | -7.6 | N/A | -2.5 | N/A | N/A | -.6 | N/A | 3.9 | 1.7 | -.2 | 5.2 |

+ and - = Increases and decreases in net trade (exports minus imports).

N/A = Not applicable.

1/ The signs for trade value changes may differ from signs of trade volume changes because price changes may more than compensate for quantity trade balance changes.

Source: Results from a SWOPSIM ST86 multilateral trade liberalization scenario run by the authors for this report.

reduce its exports of grains but increase its exports of meats. The EC would switch from an exporter of ruminant meats to one of the largest importers, and the same would be true in Japan for rice. In the sugar market, the United States would more than double its imports of sugar from developing markets, while the EC would curtail their sugar exports and be barely self-sufficient in sugar.

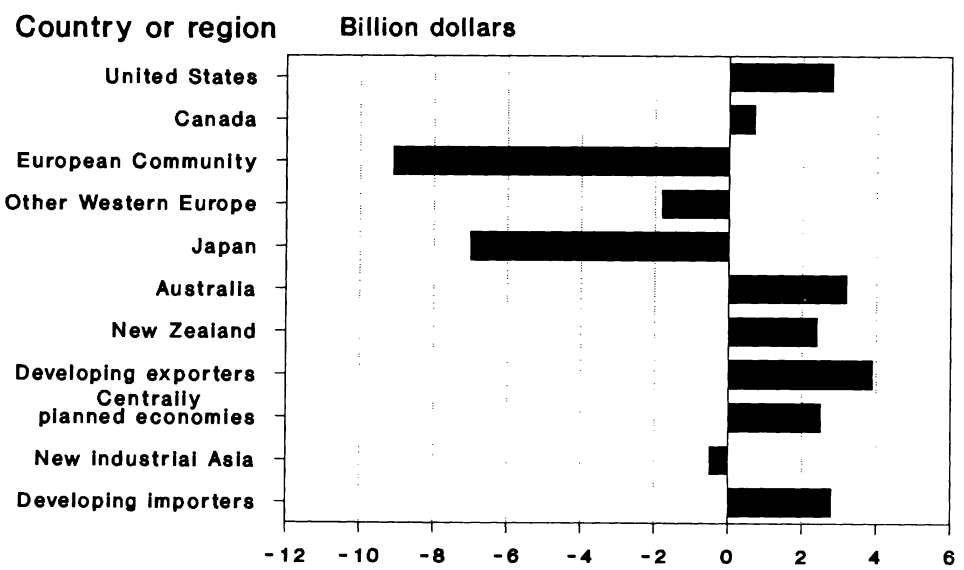
The value of net trade also changes substantially with liberalization (fig. 9 and table 6). The United States would improve its agricultural balance of trade by $3 billion, or nearly 25 percent. Most of this improvement would result from decreases in beef import costs and increases in grains export revenues because of rising world prices.

Australia and New Zealand would each improve their agricultural balance of trade by nearly $3 billion, or over two-thirds of their 1986/87 agricultural trade earnings, while the EC and Japanese balance of trade would worsen by $9 billion and $7 billion, respectively. Industrial market economies' net export earnings would decline by $9 billion, while developing countries on the aggregate would reduce their net import costs by $6 billion. The value of global trade would increase by $18 billion with multilateral liberalization.

Much of the source of trade conflict among developed countries in the last few years has been the issue of export market shares. The EC proposal for the Uruguay Round of the GATT, for instance, advocates managing exports of commodities in surplus. This is tantamount to fixing grain market shares. Table 6 shows the changes in export market shares for wheat, rice, and coarse

Figure 9

**Change in agricultural trade balance with industrial market economies liberalization, 1986/87**




Source: Calculated from SWOPSIM ST86 simulation by the authors for this report.

grains, following liberalization. Our results indicate that EC export shares in wheat trade would fall greatly with multilateral liberalization. U.S. export shares in the coarse grain and rice market would fall moderately, while rising moderately in the wheat market. The major gainers would be Australia and some of the developing exporters.

Our results on world price and trade changes point to three basic implications. First, if industrial market economies were to liberalize their policies simultaneously, world prices and trade for most commodities would increase. Second, the price increases would be greater than those that would result if individual countries liberalized unilaterally. The total effect on world prices from a multilateral removal of support is roughly the sum of all unilateral effects. Finally, there would be some changes in market shares among most major grain exporters.

**Effects on Domestic Prices and Production**

The multilateral elimination of support to agriculture in industrial market economies would lower overall producer prices for most commodities in many industrial countries (table 7).[13] Japanese producer prices would decline the most (49 percent), followed by producer prices in the EC (20 percent). As indicated earlier, both Japan and the EC have high levels of protection for domestic producers. The overall decline in U.S. producer prices (13 percent) would be much more moderate, because of increased prices for livestock producers. Producers in Australia and New Zealand would actually experience higher prices (14 and 16 percent, respectively) because increases in world prices would more than compensate for declines in government assistance.

In the case of the United States, however, prices received by producers at the farmgate level (excluding direct payments), would rise by 13 percent because of increases in world trade prices. Consequently, despite the loss of government assistance, cash receipts of U.S. producers from the market would increase by $2.6 billion following multilateral liberalization. By contrast, both farmgate prices and cash receipts from marketing would decline for EC and Japanese producers.

Production of most agricultural commodities in industrial market economies would fall with multilateral liberalization because of declines in domestic producer prices. Total U.S. farm output would fall by 1 percent, while in the EC and Japan it would decline by 7 and 32 percent, respectively. Farm output in Australia and New Zealand, not surprisingly, would increase in response to higher producer prices, as would output in all developing countries.

For industrial market economies as a whole, the largest output declines under multilateral liberalization would be for rice, sugar, and wheat. While Japan would account for nearly the entire fall in rice production, the United States would account for much of the output decreases in sugar. Over two-thirds of the decline in wheat production would occur in the EC. Global supply would

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13. Producer prices in the context of our model refer to the incentive price received by producers. Incentive prices include the full value of the producer subsidy equivalent. Farmgate prices exclude direct payments to producers (See Appendix D for additional information).

Table 7--Producer price and output changes from multilateral industrial market economies liberalization

| Commodity group | United States | Canada | EC-12 | Other Western Europe | Japan | Aus-tralia | New Zealand | Devel-oping export-ers | Cen-trally planned econ-omies | New indus-trial Asia | Devel-oping import-ers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Percent | | | | | | |
| Producer price: 1/ | | | | | | | | | | | |
| Ruminant meats | 7 | 8 | -27 | -41 | -59 | 18 | 16 | 11 | 2 | 5 | 11 |
| Nonruminant meats | 2 | 5 | -13 | -22 | -24 | 13 | 15 | 6 | 2 | 6 | 5 |
| Dairy products | -15 | -27 | -2 | -51 | -56 | 51 | 71 | 22 | 8 | 0 | 6 |
| Wheat | -44 | -18 | -44 | -35 | -87 | 17 | 37 | 11 | 8 | 8 | 21 |
| Coarse grains | -33 | -26 | -34 | -37 | -92 | 19 | 24 | 10 | 4 | 3 | 10 |
| Rice | -59 | 26 | -62 | 26 | -83 | 9 | 0 | 10 | 5 | 3 | 13 |
| Oilseeds and products | -7 | -4 | -24 | 7 | -19 | 8 | 5 | 2 | 1 | 0 | 5 |
| Sugar | -69 | -29 | -20 | -48 | -60 | 31 | 53 | 17 | 5 | 11 | 19 |
| Other crops | -27 | 26 | -42 | 5 | 4 | 9 | 4 | 3 | 1 | 2 | 4 |
| Farm products | -13 | -6 | -20 | -24 | -49 | 14 | 16 | 8 | 3 | 4 | 9 |
| Production quantity: 2/ | | | | | | | | | | | |
| Ruminant meats | 4 | 3 | -15 | -24 | -13 | 8 | 11 | 5 | 0 | 1 | 4 |
| Nonruminant meats | 0 | -2 | 0 | -9 | -15 | 7 | 8 | 3 | 0 | 2 | 2 |
| Dairy products | -5 | -4 | 0 | -17 | -18 | 8 | 15 | 6 | 2 | 0 | 4 |
| Wheat | -6 | -3 | -16 | -13 | -61 | 10 | 23 | 2 | 1 | 2 | 6 |
| Coarse grains | -4 | -15 | -4 | -10 | -71 | 5 | 11 | 4 | 0 | 0 | 3 |
| Rice | -11 | 2 | -32 | 5 | -48 | 3 | -1 | 3 | 0 | 0 | 4 |
| Oilseeds and products | 2 | 1 | -16 | -1 | -16 | 0 | 9 | 0 | 0 | 0 | -1 |
| Sugar | -42 | -10 | -3 | 0 | -34 | 14 | 0 | 8 | 0 | 2 | 5 |
| Other crops | -7 | 5 | -11 | -26 | 0 | -1 | 7 | 0 | 0 | 0 | 0 |
| Farm output | -1 | -2 | -7 | -13 | -32 | 7 | 10 | 2 | 0 | 1 | 2 |
| Agricultural gross domestic product 3/ | 16 | 18 | 16 | 5 | -6 | 35 | 47 | 21 | 20 | 17 | 25 |

1/ Producer incentive prices, including direct support payments (see Appendix D for model details).

2/ Value weighted quantity index.

3/ Value of farm production excluding support.

Source: Results from a SWOPSIM ST86 multilateral liberalization scenario produced by the authors for this report.

remain largely the same for all commodities despite multilateral liberalization. Increases in world prices would modestly stimulate production in developing countries and compensate for output changes in industrial market economies.

Despite the decline in production in most industrial countries, the net value added by agriculture would increase in those economies because of rising world

prices. The increases in nominal agricultural gross domestic product would be between 15 and 20 percent for the United States, Canada, and the EC, but much larger for Australia and New Zealand. Japanese agricultural gross domestic product would actually fall by 6 percent because of large declines in production. We might also add that agricultural gross domestic product would decline in all industrial countries if they unilaterally liberalized their policies.

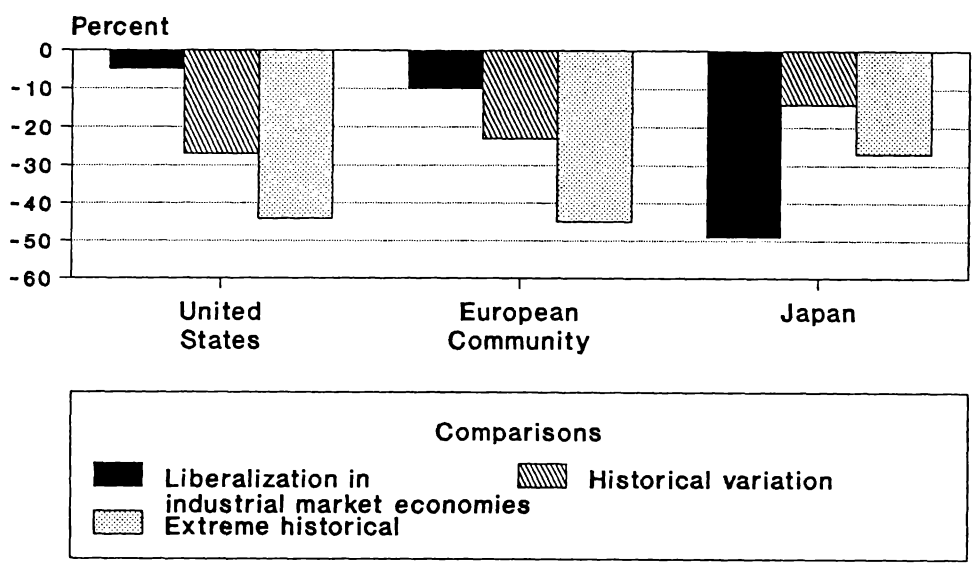
Finally, how do the magnitudes of estimated production changes compare with historical experience? As was the case with world price movements, we compared the estimated change in cereals production for the United States, the EC, and Japan with other indicators of change (fig. 10). The country comparisons provide very different perspectives. While the production decreases in the United States are much lower than the expected average annual deviation, exactly the opposite is true for Japan. In the EC, in contrast, the declines in production following multilateral liberalization are about the same as the annual average expected deviation. Farmers in the United States and the EC would be better suited to cope with production changes following liberalization than would farmers in Japan.

## Effects on Economic Welfare

Agricultural support policies in industrial countries have reduced national income by encouraging inefficient use of resources. They have also transferred incomes from the nonfarm to the farm sector and from consumers and taxpayers to agricultural producers. To better understand the economic welfare

Figure 10

**Decline in cereal production versus historical experience**




Source: Calculated by the authors from a SWOPSIM ST86 multilateral liberalization scenario and from USDA historical production data.

implications of agricultural trade liberalization, we pose two questions: What are the distortionary costs associated with the agricultural policies of each industrial market economy? What are the potential gains that can be generated if all industrial market economies liberalized their agricultural policies simultaneously?

Table 8 summarizes our estimates of the annual costs to consumers and taxpayers, the benefits to producers, and the efficiency losses (welfare costs) from distortionary policies pursued in 1986/87. Our results indicate that the costs to consumers and taxpayers of distortionary policies in individual industrial market economies are considerably more than the benefits to producers. For every dollar that producers in industrial market economies gain because of protectionist policies, consumers and taxpayers lose $1.42. Consumers and taxpayers in the United States forfeit $1.38 in transfers for every dollar gained by producers. The transfer costs are higher for the EC ($1.45) and Japan ($1.49).

Indeed, our study shows that only about 70 percent of the costs to consumers and taxpayers in industrial countries are transferred to producers. The rest represents income losses to society arising out of misallocated resources. The income losses are greatest for the EC ($15 billion), followed by the United States and Japan ($9 billion each). Because Japan has a much smaller population than either the United States or the EC, the annual per capita costs to Japan ($71) are much bigger than those for the United States ($38) or the EC ($46).

Table 8--The annual benefits of agricultural support to producers and costs to consumers and taxpayers in industrial market economies, 1986/87 1/

| Country or region | Producer benefits | Consumer costs | Tax-payers costs | Net economic costs | | Transfer benefits | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total 2/ | Per capita | Per nonfarm household | Per dollar lost by producers | Producer share of transfers | Ratio of transfers to income loss |
| | Billion dollars | | | | | Dollars | | Percent | |
| United States | 26.3 | 6.0 | 30.3 | 9.2 | 38 | 459 | 1.38 | 72 | 3.95 |
| Canada | 3.7 | 2.3 | 3.8 | 2.4 | 92 | 736 | 1.65 | 61 | 2.57 |
| EC | 33.3 | 32.6 | 15.6 | 14.9 | 46 | 485 | 1.45 | 69 | 3.23 |
| Other W. Europe | 8.8 | 4.3 | 6.3 | 1.9 | 58 | 1,073 | 1.21 | 82 | 5.71 |
| Japan | 22.6 | 27.7 | 5.7 | 8.6 | 71 | 902 | 1.48 | 68 | 3.90 |
| Australia | .6 | -.5 | 1.1 | .1 | 6 | 130 | 1.16 | 86 | 7.22 |
| New Zealand | .2 | -.2 | .5 | 0 | 3 | 223 | 1.05 | 96 | 23.00 |
| Industrial market economies | 95.4 | 72.4 | 63.1 | 36.9 | 49 | 564 | 1.42 | 71 | 3.65 |

1/ Estimates based on unilateral liberalization by the countries or regions.

2/ Total cost is the sum of producer benefits (+), consumer costs (-), and taxpayers costs (-), and includes transfers to other groups, for example, quota holders.

Source: Results from SWOPSIM ST86 simulations done by the authors for this report.

The net economic costs in table 8 do not provide an accurate indication of the total domestic costs associated with distortionary agricultural policies because they do not fully reflect the transfers from consumers and taxpayers to producers. For industrial market economies as a whole, distortionary policies cost consumers and taxpayers over $135 billion, whereas the welfare losses would be about $37 billion. The cost to consumers and taxpayers is nearly four times the welfare costs.

Most countries pursue protectionist policies to support farm incomes. Since farm population, however, accounts for only a small proportion of total population in most industrial countries, the nonfarm sector provides a large share of the assistance that goes to the agricultural sector. Our study indicates that it costs each nonfarm household in industrial market economies over $500 annually to maintain agricultural support. This burden of agricultural support programs on the nonagricultural sector is considerably more in Japan than in the United States and the EC. Because Australia and New Zealand have low levels of support, the cost to nonfarm households there is considerably lower than in other countries.

The domestic costs of distortionary agricultural policies represent a part of the welfare costs of such policies. Individual country policies not only affect producers, consumers, and taxpayers within the country but also those in other countries (table 9). While U.S. policies raise producer incomes by $26 billion, they cost producers in other countries nearly $17 billion because of their price-depressing effects. Most of the costs of U.S. policies are borne by dairy producers in the EC, and grain and sugar producers in developing countries. Producers in the other remaining countries are not greatly influenced by U.S. agricultural policies.

Table 9--Costs and benefits of agricultural support to producers, 1986/87 1/

| From policies of country or region | United States | Canada | EC-12 | Other Western Europe | Japan | Australia | New Zealand | Developing exporters | Centrally planned economies | New industrial Asia | Developing importers | Total costs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Billion dollars | | | | | | |
| United States | 26.3 | -0.7 | -7.2 | -0.8 | -0.5 | -0.6 | -0.5 | -1.1 | -2.7 | -0.1 | -3.2 | -17.4 |
| Canada | -.7 | 3.7 | -1.2 | -.2 | -.1 | -.1 | -.1 | -.2 | -.6 | 0 | -.6 | -3.8 |
| European Community | -8.1 | -1.6 | 33.3 | -1.2 | -.8 | -1.2 | -1.1 | -2.4 | -4.9 | -.2 | -5.2 | -26.7 |
| Other Western Europe | -1.1 | -.2 | -1.7 | 8.8 | -.1 | -.1 | -.1 | -.3 | -.7 | 0 | -.6 | -4.8 |
| Japan | -1.2 | -.1 | -2.0 | -.2 | 22.6 | -.2 | -.1 | -1.3 | -1.9 | -.2 | -2.9 | -10.3 |
| Australia | -.2 | -.1 | -.3 | 0 | 0 | .6 | 0 | -.1 | -.1 | 0 | -.2 | -.9 |
| New Zealand | -.1 | 0 | -.1 | 0 | 0 | 0 | .2 | 0 | 0 | 0 | 0 | -.1 |
| Total costs of others' policies | -11.3 | -2.7 | -12.5 | -2.5 | -1.5 | -2.3 | -2.0 | -5.3 | -10.9 | -.5 | -12.6 | -64.0 |

1/ Benefits (+) of support defined as lost producer surplus from unilateral liberalization scenarios of countries or regions on left.

Source: Results from SWOPSIM ST86 simulations done by the authors for this report.

By contrast, EC support policies substantially affect producers in almost every region. The gains to EC producers from their policies ($33 billion) are not much greater than losses incurred by producers in other industrial countries ($27 billion). The losses are largest for U.S. producers ($8 billion), followed by producers in developing importers ($5 billion), and $1 to $2 billion each for producers in the other regions. Most of the losses occur as a result of the EC's distortionary grain and beef policies.

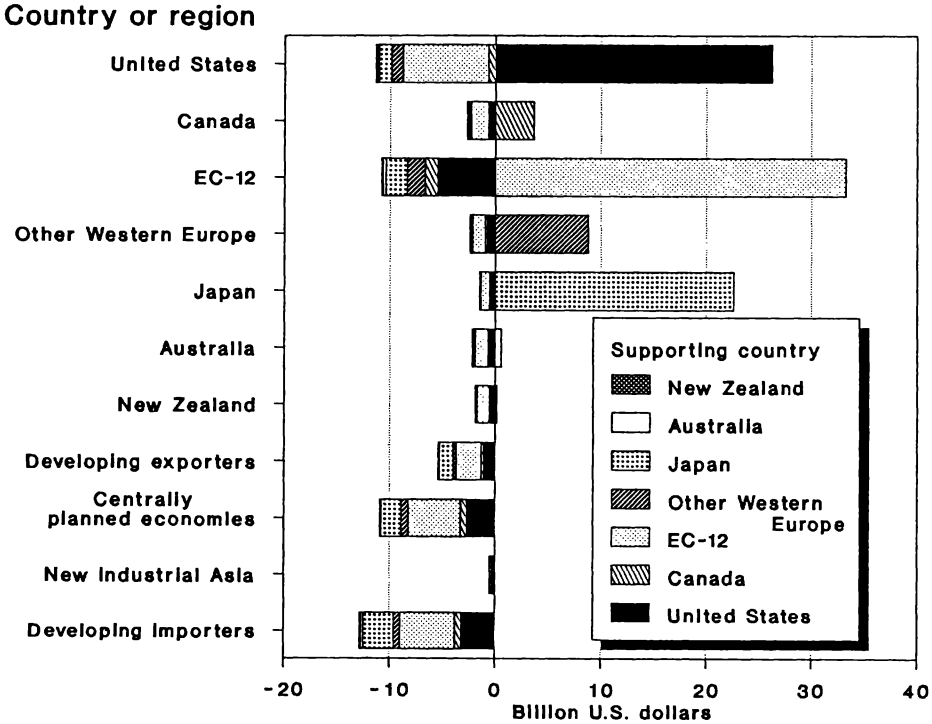
Japanese agricultural policies also cost producers in other countries substantially ($10 billion). Over a third of these costs are borne by rice producers in developing countries. Most of the remaining costs are incurred by beef, pork, and dairy producers in the United States and the EC.

Policies of Australia, New Zealand, Canada, and other Western Europe benefit their own producers significantly but have little effect on producers of other countries. This suggests that these three regions either have relatively low levels of protection or account for a small share of world agricultural trade.

One justification for the perpetuation of high levels of farm support is the need to offset losses to domestic producers from protectionist policies of other countries. Our results suggest that such an argument has merit. In the United States, for instance, over 40 percent of the support to farmers merely offsets the losses created by policies of other industrial market economies (fig. 11). The compensation required to offset losses to producers in Japan and the EC would be much less.

**Figure 11**

**Producer perspective: Costs of other countries's support (-), and benefits (+)**




Source: Results from SWOPSIM ST86 simulations done by the authors for this report.

Because protectionist agricultural policies of industrial countries have encouraged the inefficient use of resources, those economies in the aggregate would gain over $35 billion annually, about 10 percent of their combined agricultural gross domestic product (GDP) but less than one-half of 1 percent of their total GDP, from multilateral liberalization (table 10). Global real income gains would be slightly less ($30 billion). The EC would be the largest gainer (about $14 billion), followed by the United States ($9 billion) and Japan ($6 billion). These three gains would account for over 80 percent of the gains to industrial market economies from multilateral trade liberalization. Most of the gains to the United States would come from government budget savings, while those in the EC and Japan would come from consumer savings. These gains to industrial market economies depend to a large extent on our assumption of the price transmission elasticities for the centrally planned economies and developing countries. If we had assumed smaller price transmission elasticities for those regions, then the increases in world prices following multilateral liberalization would be more, and the gains to the industrial market economies would be expected to be higher. Conversely, if these economies were to take advantage of the increases in world prices and allow all of it to be transmitted to their domestic economies, then the income gains to the industrial countries would most likely be less.

Table 10--Welfare implications of multilateral trade liberalization by industrial market economies, 1986/87 1/

| Country or region | Producer welfare | Consumer welfare | Treasury savings | Net benefits 2/ Total | Net benefits 2/ Per capita |
|---|---|---|---|---|---|
| | Billion dollars | | | | Dollars |
| United States | -16.2 | -4.6 | 30.3 | 8.6 | 36 |
| Canada | -1.3 | .2 | 3.8 | 2.6 | 101 |
| European Community | -22.7 | 21.2 | 15.6 | 14.0 | 43 |
| Other Western Europe | -6.8 | 1.8 | 6.3 | 1.3 | 41 |
| Japan | -21.8 | 24.7 | 5.7 | 6.3 | 52 |
| Australia | 1.6 | -1.5 | 1.1 | 1.1 | 71 |
| New Zealand | 1.7 | -.8 | .5 | 1.3 | 396 |
| Developing exporters | 5.1 | -4.8 | -.3 | .7 | 2 |
| Centrally planned economies | 9.8 | -10.3 | .1 | -.8 | -1 |
| New industrial Asia | .5 | -.9 | .1 | -.9 | -13 |
| Developing importers | 11.8 | -14.5 | -.1 | -4.4 | -2 |
| Industrial market economies | -65.6 | 40.9 | 63.1 | 35.3 | 51 |
| Developing countries | 17.4 | -20.2 | -.3 | -4.5 | -2 |
| Centrally planned economies | 9.8 | -10.3 | .1 | -.8 | -1 |
| Global | -38.4 | 10.4 | 62.8 | 29.9 | 7 |

1/ Estimated change in producer surplus, consumer surplus, net government expenditures, and the sum of all three.

2/ Net benefits include losses by other groups, for example, quota holders.

Source: Multilateral liberalization scenario with the SWOPSIM ST86 world agricultural trade model.

On a per capita basis, the country that would benefit the most from multilateral liberalization would be New Zealand ($396). Much of the gains in New Zealand would accrue to producers who obtain higher international prices for their exports. The net per capita benefits to the United States ($36), the EC ($43), and Japan ($52) would be relatively low, less than 1 percent of per capita gross national product. The U.S., EC, and Japanese gains are low because agriculture's contribution to gross domestic product is very small (about 2 percent) in all three regions unlike that for New Zealand (9 percent).

These modest per capita gains, however, should not be used to decry the importance of policy reform. For one thing, the net benefit to a country is small when compared with the transfer of incomes within the country. The income gains to consumers and taxpayers in the United States and the EC are nearly three times the increase in national incomes. In Japan, the ratio is four to one. Another reason for the small gains is the relatively low agricultural net supply elasticities assumed, which imply that resources cannot easily shift away from the sector. If larger elasticities were assumed, then resource movements among sectors would be easier and the gains from liberalization would be larger. This has been well illustrated by (Bale and Lutz, 1981) in their work on an international comparison of agricultural price distortions.

Whether producers gain or lose from multilateral liberalization and require compensation, could be of considerable concern in the new round of international trade negotiations.[14] Our results indicate that producers in the EC, Japan, and the United States could lose between $15 and $25 billion with multilateral trade liberalization. Most of these losses result from the elimination of government assistance. Rice producers in Japan, beef producers in the EC, and grain producers in the United States account for most of the losses.

While the losses in producer incomes may appear large, such losses would be even greater if industrial market economies were to attempt unilateral policy reform to redress their budgetary problems. An important feature of our results is that producers would lose much less (or require much less compensation) in a multilateral reduction of support as opposed to unilateral elimination of agricultural assistance because increases in international prices would be much higher when all countries eliminate support (fig. 12). U.S. producer losses would be cut by nearly two-fifths under multilateral liberalization, while those for the EC would be a third lower. Producers in Japan, in contrast, would lose about the same under either scenario because Japanese agricultural support levels (PSE's) are high relative to those of other countries.

The United States and the EC clearly have greater incentives to enter into a multilateral agricultural policy reform agreement than Japan. Much less compensation would be required to maintain income levels if all countries removed

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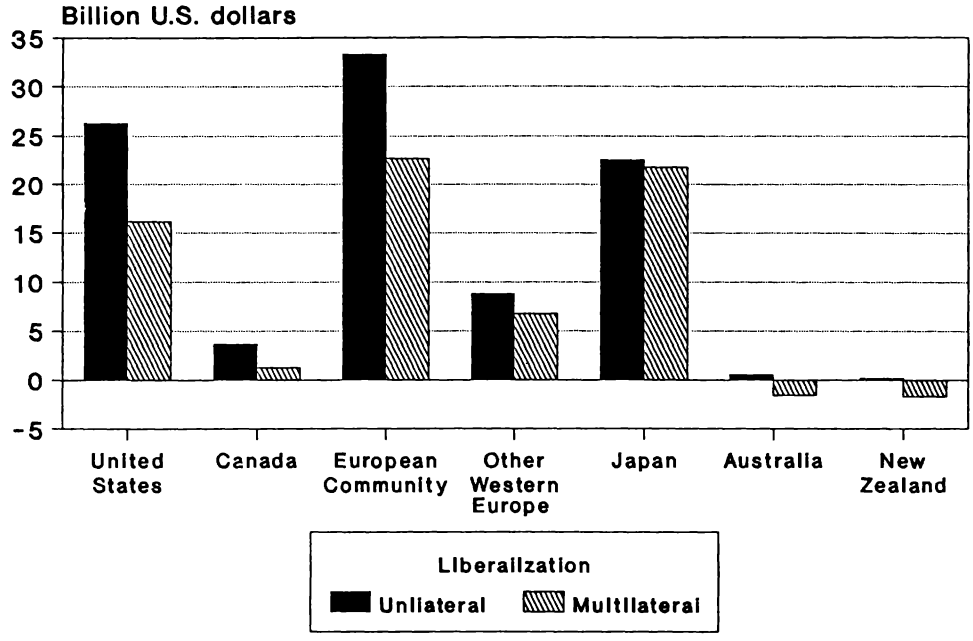
14. Presumably losses by producers could be compensated for by decoupled payments as stated in the U.S. proposal (Rossmiller, 1988), especially if losses to producers are less than the government expenditures on farm programs. In the case of the United States, even if all losses in producer incomes are compensated for, the savings to the Treasury would still be $14 billion.

Figure 12

**Compensation requirements for multilateral and unilateral liberalization**




Source: Results from SWOPSIM ST86 liberalization scenarios.

agricultural support simultaneously.[15]

Producers, consumers, and taxpayers in developing countries would also be affected by agricultural trade liberalization by industrial market economies (table 10). The effect is through changes in world market prices. It is easy to understand why food-importing developing countries like India, Nigeria, or even Taiwan and South Korea would lose with higher world prices. The increases in costs of food and fiber to consumers would be more than the income gains to farmers. Developing countries who are agricultural exporters, like Argentina and Brazil, in contrast, would gain from multilateral industrial country liberalization because increases in incomes from agricultural exports would more than offset the higher food costs to consumers. Since developing countries as a whole are net importers of agricultural products included in our model, they would lose nearly $5 billion from multilateral trade liberalization by industrial market economies.

## Limitations of the Analysis

Since the forces influencing trade are constantly changing, the economic implications of trade liberalization are likely to differ depending upon the period under analysis. In comparing the results of this study with an earlier

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15. The actual compensation required may less than the producer income losses shown by our results because, in reality, part of the transfer goes to upstream and downstream activities.

study (Roningen and Dixit, 1987) that used the 1984/85 marketing year as the base, we found that liberalization of policies by industrial market economies would have led to much larger increases in world agricultural prices under 1986/87 market conditions than under 1984 conditions (fig. 13). The price increases would be especially large for wheat, coarse grains, and rice because levels of protection on grains rose rapidly during the two periods relative to those for other products. Similarly, the real income gains from liberalization would be larger under 1986/87 conditions than under 1984/85 conditions simply because agricultural protectionism, measured as the weighted average of PSE's across commodities and countries, rose between the two periods. Changes in the market structure would affect the outcome of trade liberalization considerably.

Furthermore, our model deals with only a subset of agricultural products. Most notable among the omissions are tropical products which account for nearly half the value of global agricultural trade. Producers of these commodities tend to be taxed in developing countries but protected in industrial market economies. Their inclusion in our model would increase the benefits of agricultural trade liberalization to developing countries. Our conclusions on the implications of industrial market economy trade liberalization to developing countries are more applicable to developing exporters like Argentina because a large portion of their agricultural trade is accounted for by commodities included in the model.

Our model provides a very naive interpretation of the world agricultural market. It does not recognize the substantial product differentiation among the broad commodity aggregates we use. Hard high-protein wheat exported by the United States, for example, is very different from soft low-protein wheat exported by the EC. The model also does not take into account institutional rigidities and politics. The failure to recognize some of these real world complexities could have different implications than suggested by our model.

The model results are based upon the assumption that the centrally planned economies do not change their policies as a result of higher world prices. If policies change, the results could change. This is especially true in the grain sector, where centrally planned economies account for a substantial portion of world trade.

The true benefits to society from multilateral liberalization are likely to be underestimated in a model like ours. Our costs do not include the expenses incurred by farm group lobbying to support farmers or other groups seeking to reduce food costs. In addition, the costs associated with the greater instability of international prices generated by distortionary policies are not taken into account. These costs, however, are likely to be very small.

Our results are generated from a partial equilibrium intermediate-run model which assumes that factor prices are fixed. This assumption implies that the agricultural sector faces an infinitely elastic supply of factors. While this assumption may hold for capital, it is much less likely to be true for labor, especially in the short run, and land.[16] A general equilibrium model could

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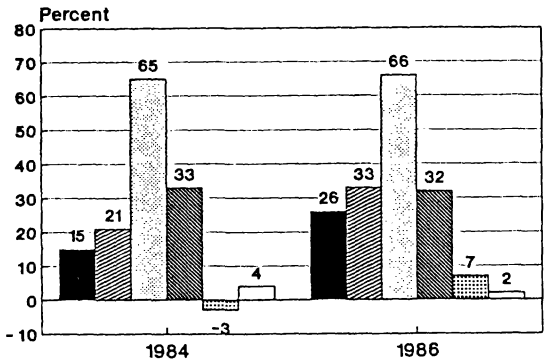
16. Land prices are certainly not fixed with respect to agricultural policy, but this assumption may not create much of a problem if agricultural land has no alternative use and its return is pure rent.

Figure 13

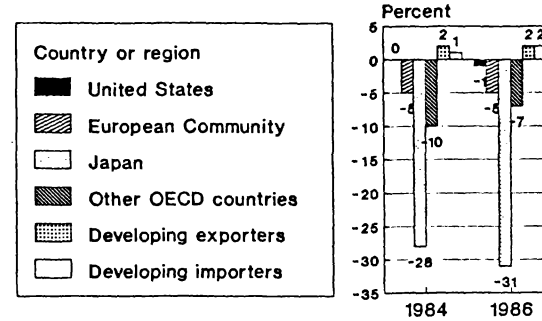
**Comparison of 1984 and 1986 industrial market economies liberalization scenarios**

## Average support levels (PSE's)



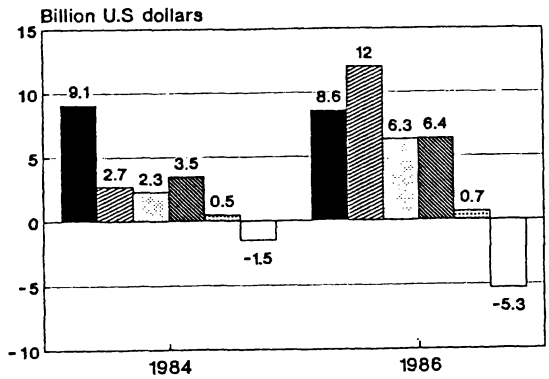

Index weighted by base production value

## Change in production levels

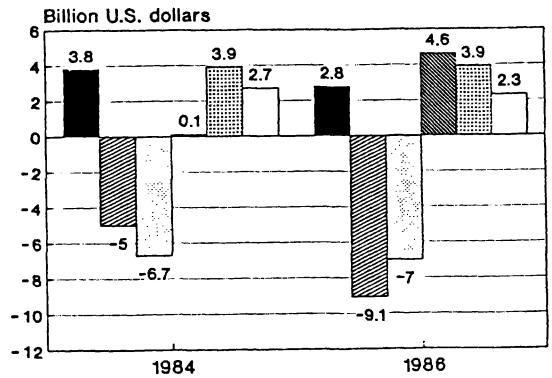



Index weighted by base production value. Other OECD countries = Canada, other Western Europe, Australia, New Zealand.

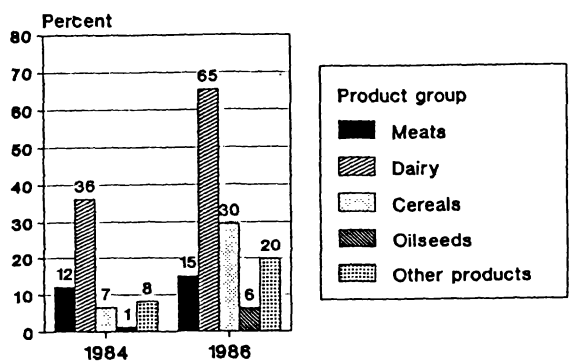
## Change in welfare




## Change in trade balance

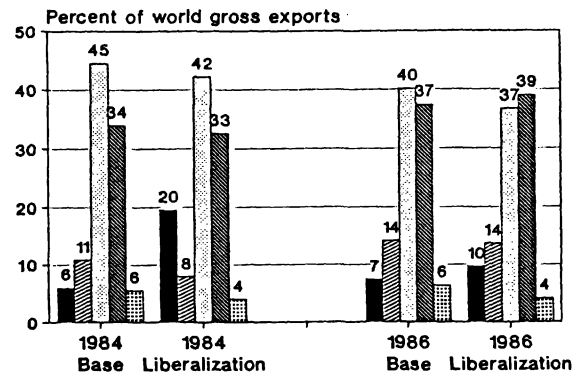



## Increase in world prices




Index weighted by base world production

## U.S. export shares




Source: Results of SWOPSIM ST84 and ST86 multilateral liberalization scenarios.

examine resource shifts between agriculture and the rest of the economy and provide greater insights about the effects of agricultural liberalization on other sectors, factor markets, and balance of payments. These effects, as pointed out in a number of recent studies, could be substantial.

(Stoeckel and Breckling, 1988) show that agricultural protection in the EC has contributed to deindustrialization in Europe, lowering manufacturing output by 1.2 percent and directly costing the EC between 2 and 4 million jobs. (Hertel, Thompson, and Tsigas, 1988) similarly illustrate the substantial nonfarm costs to support U.S. agriculture. To keep one farm job in agriculture, they say, the nonfarm economy gives up $107,000 in nonfood output. To the extent that the effects on the nonagricultural sector are not taken into account in our modeling effort, our study possibly understates the true benefits to society from agricultural liberalization.

How would factor markets be influenced by agricultural liberalization? Economic theory suggests that price supports cannot influence wages and returns to capital in agriculture alone because, in the long run, capital and labor are mobile between sectors. A rise in agricultural prices encourages agricultural production and increases demand for all factors of production in that sector. Because agriculture is small relative to the rest of the economy, labor and capital can be attracted without changes in factor prices. This, however, would not be the case with land. Agricultural land is basically fixed in supply and so its price is bid up with increases in output prices. Thus, in the long run, the benefits of farm support accrue not to labor and capital but to landowners at the time the farm policies were introduced. Some farmers own land and benefit accordingly but many do not and end up paying higher rents from price supports (Winters, 1987).

(Robinson, Adelman, and Kilkenny, 1988) report that unilateral liberalization of U.S. agricultural policies could lower use value of land by as much as 34 percent. (Hertel, Thompson, and Tsigas, 1988) point out that U.S. farm policies may have created capitalized value of landowner gains of as much as $114 billion, more than four times greater than our estimate that the income loss to U.S. producers of eliminating farm programs would be about $25 billion. If one believes that many of the benefits of government support programs arise from an appreciation in land values, then the adjustment costs to landowners of eliminating such programs could be greater than those reported in this study.

What about the effects of liberalization on family farms and the structure of farming? The largest 30 percent of U.S. farms receive nearly 90 percent of direct government payments to agriculture, while 25 percent of farmers in the EC receive 75 percent of the assistance offered by the CAP. Moreover, evidence in both region indicates that even with government programs, the number of farms has been rapidly declining, while the size of holdings has been increasing. It could be argued that government programs may have arrested the decline in family farms by enabling high-cost producers to remain in agriculture.[17] Indeed, if this were true, any elimination of government programs could force the marginal producer to exit farming, leading to larger and more efficient farms. Yet, despite this possibility, it appears highly

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17. Others argue that government programs have raised the cost of production and accelerated the exodus of small farmers from agriculture.

unlikely that elimination of government subsidies would substantially affect the financial survival of most farms currently in the sector given that adjustments are already occurring in agriculture, especially U.S. agriculture, in response to declining profitability. The structure of agriculture may change, but this would more likely be a continuation of trends in the 1980's rather than the direct result of agricultural liberalization. The changes that do occur directly from liberalization would be confined more to factor use and the nature of farming, intensive versus extensive farming, rather than to solvency and farm structure.[18]

Our model also does not fully capture the long-term effect of liberalization on economic efficiency. The gains we reported are primarily medium-term gains. In the longer run, investment and research efforts can be redirected and technology changed. The rate and extent to which factors of production can move between alternative economic activities would be critical in determining the longrun dynamic efficiency gains from liberalization.

Lucas argued that models estimated using data under past policy regimes may not be relevant to current or future market conditions (Lucas, 1976). This issue is of special concern when large shocks like trade liberalization occur. Should policy regimes change drastically, as would be the case with trade liberalization, a model based on historical parameters may not quite give us the correct story.

Other studies, however, generally confirm the type of results we get for trade liberalization even though different models are used. (Magiera and Herlihy, 1988) show that most prominent studies get similar patterns of world price changes with liberalization and that a SWOPSIM model can obtain similar world price changes if it uses support levels from those studies (fig. 14).

Furthermore, (Magiera and Herlihy, 1988) show that the support levels themselves are the most important elements in determining the degree of world price change with liberalization. Studies using higher levels of support tend to get larger world price changes and associated effects (fig. 15). Moreover, as shown by (Kilkenny and Robinson, 1988), our results, derived from a partial equilibrium model, are also broadly consistent with results that were obtained from a Computable General Equilibrium model that takes a longer term outlook.

## Lessons to be Learned

Recently, there has been growing concern about the costs of protectionist agricultural policies and the potential benefits that would accrue if countries were to multilaterally eliminate assistance to agriculture. Our results suggest that such concerns are justified because current policies have introduced substantial distortions into the domestic and international marketplace.

Consumers and taxpayers have had to bear the burden of support to agricultural producers. Where the support has been financed through budgetary measures,

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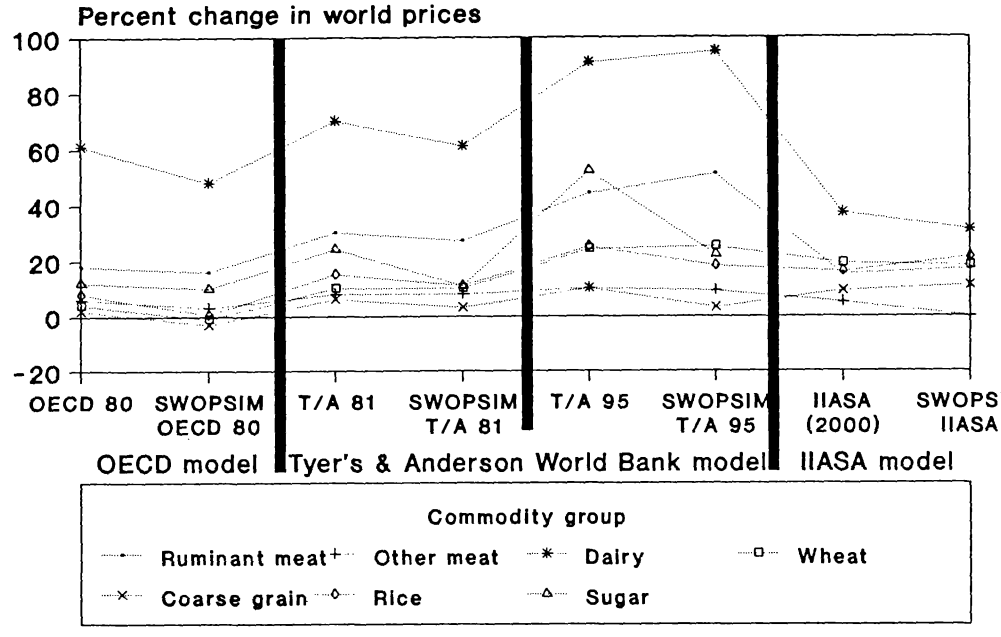
18. Because the price of land would be lower relative to labor and capital, one would expect that with trade liberalization, there would be a tendency for extensive farming.

Figure 14

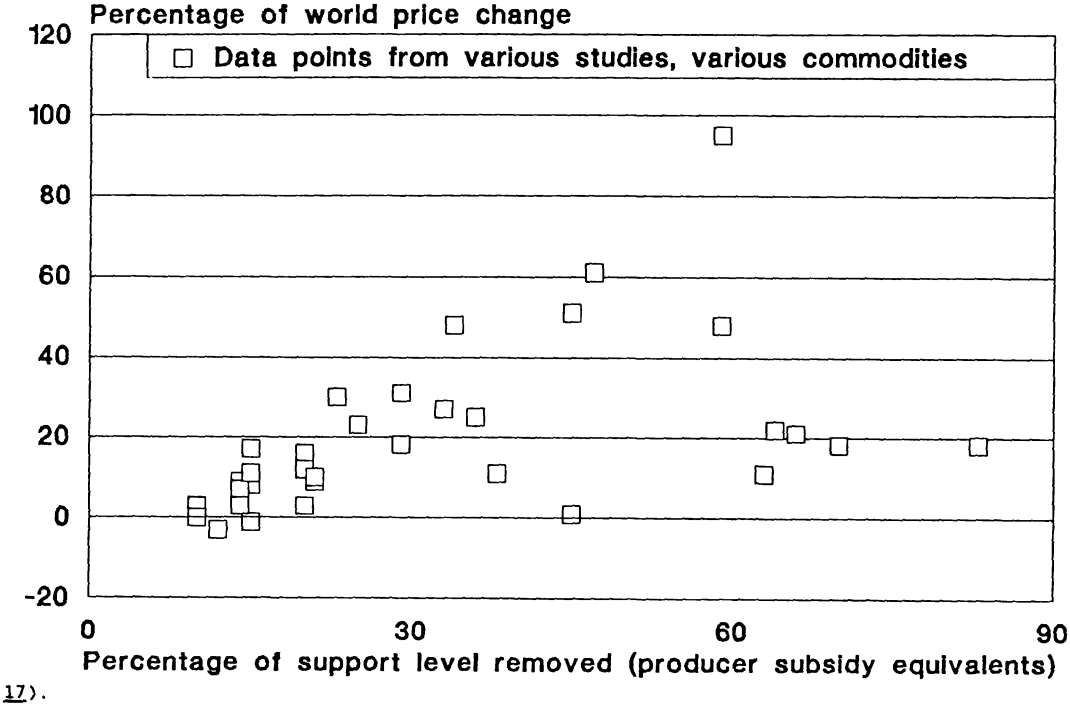
**World price changes from liberalization, results from selected studies**




Source: (17) Effects across studies are shown by the commodity line. Effects of the same support level in the orginal model and the SWOPSIM version are shown BETWEEN the bars.

Figure 15

**Scatter diagram of world price changes versus support levels**




Source: (17).

the costs have been apparent. In other instances, where support has originated through production controls or other similar price-enhancing measures, the costs are more hidden. Nevertheless, the costs to consumers and taxpayers in most countries outweigh the benefits to producers, generating real income losses domestically and globally. Indeed, our results suggest that policies used by industrial market economies to transfer resources between the farm and the nonfarm sectors are inefficient, and that less distortionary and wasteful alternatives could be devised to achieve the same farm income objectives.

The incentives for liberalization vary widely across countries. On a per capita basis, Australia and New Zealand have a lot to gain from any liberalization effort. It is, therefore, not surprising that these two countries have been in the forefront of the international effort to reverse the proliferation of agricultural protectionism. The incentives for the United States and the EC originate not necessarily from the potential real income gains from multilateral liberalization, but rather from the need to curtail escalating costs of farm programs. Elimination of agricultural assistance could go a long way in reducing government deficits and lowering trade tensions among political allies. For Japan, the incentive for liberalization rests on consumer well-being. Whether this is a realistic motivation, however, remains to be seen. History suggests that Japanese consumers are willing to sacrifice for the well-being of agricultural producers and that there might not be sufficient significant domestic political pressures for substantial policy reform.

The story for developing countries is complex because of the diversity in their economies as well as their policy regimes. Developing exporters like Argentina and Brazil would benefit immensely from any increases in world prices. Yet, since most developing countries are net importers of food products, liberalization that lead to higher prices could hurt them. This suggests that industrial market economy liberalization might be more acceptable to them if accompanied by increased development assistance or trade concessions in other areas.

Any policy reform will inevitably generate both winners and losers. Our objective in this report was to provide a quantitative assessment of the potential gains and losses from multilateral trade liberalization. We infer from our analysis that multilateral liberalization would primarily benefit consumers and taxpayers at the expense of producers and that adjustment costs to the farm sector could be minimized if countries liberalized their agricultural policies simultaneously rather than unilaterally.

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## Appendix A--Master Model File For ST86

SWOPSIM models require a master model file that defines the commodities and countries or regions covered in a particular model. This appendix shows the master model file for the model used for this study, ST86.

ST86 has 22 commodities or commodity groups. The mnemonics for these are presented and defined in the master file. Most SWOPSIM programs use the information in this master file to determine country and commodity coverage. The first part of the file gives a matrix of country or commodity coverage where letters or a 1 indicates that there are supply, demand, and trade equations for a particular country or region and commodity. The matrix also gives information on commodities such as beef, pork, mutton, poultry meat, eggs, and milk that are using feeds such as wheat, corn, other coarse grains, soymeal, other meals and which commodity is nontraded, such as fluid milk in ST86. Information is also given on intermediate demand input sectors (milk, soybeans, and other oilseeds) and intermediate demand output sectors (butter, cheese, milk powder, soymeal, soyoil, other meals, and other oils).

The base data source for quantity data is the Foreign Agricultural Service's (FAS) world supply and utilization database, while the source of agricultural support data is the Economic Research Service's agricultural world support (PSE's and CSE's) database.

SWOPSIM aggregation programs were used to aggregate country or region base data, elasticities, and support data into broader aggregate regions for ST86. Spain and Portugal were added to the EC-10. Brazil, Argentina, Indonesia, Thailand, Malaysia, and the Philippines were aggregated as developing country exporters. Eastern Europe, the Soviet Union, and China became the centrally planned economies region. The developing country importers region is an aggregation of South Africa, Mexico, Central America and the Caribbean region, Venezuela, the other Latin America region, Nigeria, the other Sub-Saharan Africa region, Egypt, the Middle East and North Africa regions (oil producers and nonoil producers), India, the other South Asia region, the other Asia region, and the rest-of-the-world region (which contains data to balance world exports and imports).

The aggregate commodity groups are: other coarse grains (barley, rye, oats, millet, sorghum, and mixed grains), other oilseeds (peanuts, copra, palm kernels, flaxseed, cottonseed, sunflower seed, rapeseed, sesame seed, and safflower seed), other meals (peanut meal, copra meal, palm kernel meal, linseed meal, cottonseed meal, sunflower meal, rapeseed meal, sesame meal, safflower meal, and fishmeal), and other oils (peanut oil, copra oil, palm kernel oil, cottonseed oil, sunflower oil, rapeseed oil, palm oil, sesame seed oil, and safflower oil). Since aggregation routines were used on the FAS database for these categories, the operational definition of the commodity aggregates may differ for each region, according to that region's mix of commodities. The aggregation assumption, however, is that these aggregate groups are effectively one market.

## Appendix table A1: Master model file for ST86

ST86 Master model file for Small Trade liberalization model

| | IME | | | | | | | DC | CP | DC | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | US | CN | EC | WE | JP | AU | NZ | DE | CP | DA | RW | - | - | - | - |
| BF | D | D | D | D | D | D | D | D | D | D | D | IU | . | . | . | . |
| PK | D | D | D | D | D | D | D | D | D | D | D | IU | . | . | . | . |
| ML | D | D | D | D | D | D | D | D | D | D | D | IU | . | . | . | . |
| PM | D | D | D | D | D | D | D | D | D | D | D | IU | . | . | . | . |
| PE | D | D | D | D | D | D | . | D | D | D | D | IU | . | . | . | . |
| DM | D | D | D | D | D | D | D | D | D | . | D | IU | IN | NT | . | . |
| DB | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | 1 | . | OU | . | . | . |
| DC | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | 1 | . | OU | . | . | . |
| DP | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | 1 | . | OU | . | . | . |
| WH | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | I | . | . | . | . |
| CN | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | I | . | . | . | . |
| CG | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | I | . | . | . | . |
| RI | 1 | 1 | 1 | 1 | 1 | 1 | . | 1 | 1 | 1 | 1 | . | . | . | . | . |
| SB | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | IN | . | . | . |
| SM | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | I | OU | . | . | . |
| SO | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | OU | . | . | . |
| OS | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | IN | . | . | . |
| OM | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | I | OU | . | . | . |
| OO | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | OU | . | . | . |
| CT | 1 | 1 | 1 | 1 | 1 | 1 | . | 1 | 1 | 1 | 1 | . | . | . | . | . |
| SU | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | . | . | . | . |
| TB | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | . | . | . | . |
| ^ | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |

| CODE | ST86 COUNTRY/REGION | TL86 COUNTRY/REGION |
|---|---|---|
| US | United States | US |
| CN | Canada | CN |
| EC | European Community (12) | EC SP PT |
| WE | other Western Europe | WE |
| JP | Japan | JP |
| AU | Australia | AU |
| NZ | New Zealand | NZ |
| DE | Developing country Exporters | BZ AR DO TH ML PH |
| CP | Centrally Planned countries | EE SV CH |
| DA | Developing Asian importers | SK TW EA |
| RW | Rest of World = other developing country importers | SF MX CA VE LA NG AF EG MP MO ND OS SA OA RW |

CODE DEFINITION OF MATRIX CELL CODES

. No equation created for this country/region & product (however, note that RW region MUST have equations for all products to close world model).

1 Supply and demand equations created for this country/region & product.

S Supply and demand equations created AND demand quantity for this country/region & product can be included in any SUPPLY equation.

D Supply and demand equations created AND supply quantity for this country/region & product can be included in any DEMAND equation.

SD or DS Supply and demand equations created AND demand quantity for this country/region & product can be included in any SUPPLY equation AND supply quantity for this country/region & product can be included in any DEMAND equation.

SECTOR CODES

IU Input Using sector
I Input (e.g. feed)

IN intermediate demand INput
OU intermediate demand OUtput

NT Non-Traded product

IME Industrial Market Economies
DC Developing Countries
CP Centrally Planned countries

Appendix table A1: Master model file for ST86--Continued

Commodity Group Definitions for ST86

| CODE | PRODUCT GROUP------ | CODE | PRODUCT GROUP------ |
|---|---|---|---|
| BF | BeeF and veal | CG | other Coarse Grains |
| PK | PorK | RI | RIce |
| ML | Mutton and Lamb | SB | SoyBeans |
| PM | Poultry - Meat | SM | SoyMeal |
| PE | Poultry - Eggs | SO | SoyOil |
| DM | Dairy - fresh Milk | OS | Other oilSeeds |
| DB | Dairy - Butter | OM | Other Meals |
| DC | Dairy - Cheese | OO | Other Oils |
| DP | Dairy - milk Powder | CT | CoTton |
| WH | WHeat | SU | SUgar |
| CN | CorN | TB | ToBacco |

TLIB data set source:

FAS Commodity Supply and Utilization data

ERS Commodity Support data

Note that capitalization patterns in the commodity and country\region names in this master file suggest the mnemonic used. This worksheet is a direct copy of the ST86 master computer file.

World Reference Prices and Sources for ST86

| 1986 World price WDPRICE | | ----Published price---- .00 1984 | .00 1985 | 1.00 1986 | Product used for world price | Unit Unit | Factor used for conversion to U.S.$/MT | Source |
|---|---|---|---|---|---|---|---|---|
| BF | 2091 | 103.11 | 97.67 | 94.88 | Beef | US cents/lb. | 22.0462 | IFS - 76kb - All Origins (US Ports) |
| PK | 2341 | 2122.18 | 2031.91 | 2341.79 | Pork | US$/MT | 1 | FATUS - United States (Import Unit Value) |
| ML | 2030 | 87.70 | 83.56 | 92.11 | Lamb | US cents/lb. | 22.0462 | IFS - 76pf - New Zealand (London) |
| PM | 1083 | 1225.91 | 1074.47 | 1083.77 | Poult y Meat | US$/MT | 1 | FATUS - United States (Export Unit Value) |
| PE | 2145 | 2067.27 | 1766.76 | 2145.74 | Poultry Eggs | US$/MT | 1 | FATUS - United States (Export Unit Value) |
| DM | 275 | 278.00 | 270.00 | 275.00 | Milk - whole | US$/MT | 1 | ERS - New Zealand (CONSTRUCTED product prices) |
| DB | 2048 | 93.93 | 91.23 | 92.92 | Butter | US cents/lb. | 22.0462 | IFS - 76fl - New Zealand (Lond.-1984, CONST. 85,86) |
| DC | 2744 | 2774.74 | 2694.89 | 2744.80 | Cheese | US$/MT | 1 | FATUS - U.S. (Import Unit Value-1986, CONST. 85,86) |
| DP | 1984 | .91 | .88 | .90 | Milk Powder | US$/lb. | 2204.62 | United States (Average Price-1984, CONST. 85,86) |
| WH | 115 | 4.15 | 3.70 | 3.13 | Wheat | US$/bu. | 36.7437 | IFS - 76d - United States (US Gulf Ports) |
| CN | 87 | 3.45 | 2.85 | 2.23 | Maize | US$/bu | 39.368 | IFS - 76j - United States (US Gulf Ports) |
| CG | 82 | 118.19 | 102.97 | 82.41 | Sorghum | US$/MT | 1 | IFS - 76tr - United States (US Gulf Ports) |
| RI | 210 | 252.25 | 217.42 | 210.19 | Rice | US$/MT | 1 | IFS - 76h - Thailand (Bangkok) |
| SB | 208 | 282.08 | 224.42 | 208.42 | Soybeans | US$/MT | 1 | IFS - 76jf - United States (Rotterdam) |
| SM | 184 | 197.17 | 157.17 | 184.75 | Soybean Meal | US$/MT | 1 | IFS - 76jj - United States (Rotterdam) |
| SO | 342 | 725.17 | 576.00 | 342.41 | Soybean Oil | US$/MT | 1 | IFS - 76ji - All Origins (Dutch Ports) |
| OS | 324 | 349.76 | 349.85 | 324.76 | Groundnuts | US$/MT | 1 | IFS - 76bh - Nigeria (London) |
| OM | 166 | 187.50 | 146.25 | 166.00 | Groundnut Cake | US$/MT | 1 | IFS - 76bj - All Origins (Europe) |
| OO | 569 | 1016.70 | 905.30 | 569.40 | Groundnut Oil | US$/MT | 1 | IFS - 76bj - West Africa (Europe) |
| CT | 1056 | 80.94 | 59.92 | 47.94 | Cotton | US cents/lb. | 22.0462 | IFS - 76f - Liverpool Index |
| SU | 133 | 5.20 | 4.05 | 6.05 | Sugar | US cents/lb. | 22.0462 | IFS - 76ia - Caribbean (New York) |
| TB | 3606 | 185.60 | 184.33 | 163.60 | Tobacco | US cents/lb. | 22.0462 | IFS - 76m - United States (All Markets) |

Appendix table A1: Master model file for ST86--Concluded

Country/Region Definitions in ST86

| TLIB CODE | COUNTRY/REGION IN TLIB DATABASE | CODE IN ST86 MODEL |
|---|---|---|
| --DC--- | Developed Countries | |
| US | United States | US |
| CN | CaNada | CN |
| EC | European Community | EC |
| SP | SPain | EC |
| PT | PorTugal | EC |
| WE | other Western Europe | WE |
| JP | JaPan | JP |
| AU | AUstralia | AU |
| NZ | New Zealand | NZ |
| SF | South AFrica | RW |
| --CP--- | Centrally Planned countries | |
| EE | Eastern Europe | CP |
| SV | SoViet Union | CP |
| CH | CHina (Peoples' Republic) | CP |
| --LA--- | Latin America | |
| MX | MeXico | RW |
| CA | Central America & Caribbean | RW |
| BZ | BraZil | DE |
| AR | ARgentina | DE |
| VE | VEnezuela | RW |
| LA | other Latin America | RW |
| --RW--- | Rest of world | RW |

(Sources of World Reference Price Data)

IFS - International Financial Statistics from the International Monetary Fund - Washington, D.C.

FAO - United Nations Food and Agriculture Organization - Rome

ERS - Economic Research Service - U.S. Department of Agriculture - Washington, D.C.

FAS - Foreign Agricultural Service - U.S. Department of Agriculture - Washington, D.C.

| TLIB CODE | | ST86 CODE |
|---|---|---|
| --ME--- | Subsaharan Africa & Middle East | |
| NG | NiGeria | RW |
| AF | Other subsaharan AFrica | RW |
| EG | EGypt | RW |
| MP | Middle East & N. Africa - oil Producers | RW |
| MO | Middle East & N. Africa - O. countries | RW |
| --AS--- | ASia | |
| ND | INDia | RW |
| OS | Other South Asia | RW |
| DO | InDOnesia | DE |
| TH | THailand | DE |
| ML | MaLaysia | DE |
| PH | PHilippines | DE |
| SA | other Southeast Asia | RW |
| SK | South Korea | DA |
| TW | TaiWan | DA |
| EA | other East Asia | DA |
| OA | Other Asia | RW |

Note: Base data, elasticities, and support data for ST86 are aggregated from a larger (TLIB) 22 commodity, 36 region data base by SWOPSIM aggregation routines.

## Appendix B--Supply and Demand Elasticity Matrices

This appendix lists the supply and demand elasticity matrices for each country/region in the ST86 model. Additional details on all 36 countries/regions can be found in (Sullivan, Wainio, and Roningen, 1989).

The commodity codes bordering the matrices are defined as: BF - beef and veal, PK - pork, ML - mutton and lamb, PM - poultry meat, PE - poultry eggs, DM - dairy milk, DB - dairy butter, DC - dairy cheese, DP - dairy milk powder, WH - wheat, CN - corn, CG - other coarse grains, RI - rice, SB - soybeans, SM - soymeal, SO - soyoil, OS - other oilseeds, OM - other meals, OO - other oils, CT - cotton, SU - sugar, and TB - tobacco. The sum column at the end of the rows is the sum of the own- and cross-price elasticities in that row. A blank space in the matrix indicates that an elasticity is not generally allowed in the model for that cell. A zero means that an elasticity value of zero is assumed.

For details about the sources of elasticities, see (Gardiner, Liu, and Roningen, 1989). For details about the application of duality theory to feed demand elasticities in meat supply equations and to elasticities for the dairy and oilseed sectors, see (Haley, 1988). Given the elasticities in the matrices, SWOPSIM programs create constant elasticity supply and demand equations with intercepts initializing the equations for base period data. Milk demand is specified as demand for fluid and manufacturing milk (used to make butter, cheese, and powder), and oilseed demand is interpreted as a crushing demand for domestic or imported oilseeds. Elasticities for aggregate regions are weighted for aggregation purposes by supply quantity on the supply side and by consumption quantity on the demand side.

The last table in this appendix gives the assumed feed demand shares for each feed for each country or region as well as the share of fluid (drinking) milk assumed in milk production. These shares were aggregated across database for countries or regions to ST86 aggregates using consumption quantity weights.

The column sums serve as overall checks on the elasticity matrices. Own- or cross-price elasticities were adjusted if the row sums were negative on the supply side or positive on the demand side. In addition, the row sums were compared across similar commodity groups and across countries. Extreme variances not explainable usually led to adjustments in elasticities.

The elasticities are considered mid-term to long term and represent an adjustment that could occur with shocks to supply or demand over a 5-year or longer period. The reasonableness of quantity changes in the ST86 world model resulting from shocks served as the ultimate test of the believability of the elasticities.

Appendix table B1: United States--Supply and demand elasticity matrices

| Supply | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | .65 | -.01 | -- | -- | -- | .02 | | | | -- | -.07 | -.02 | | | -.01 | | | -- | | | | | .56 |
| PK | -.02 | 1.00 | -- | -.01 | -- | -- | | | | -.01 | -.27 | -.07 | | | -.13 | | | -.01 | | | | | .47 |
| ML | -- | -- | .80 | -- | -- | -- | | | | -- | -.18 | -.04 | | | -- | | | -- | | | | | .58 |
| PM | -- | -.01 | -- | .65 | -.02 | -- | | | | -.02 | -.08 | -.02 | | | -.11 | | | -- | | | | | .39 |
| PE | -- | -- | -- | -.04 | .55 | -- | | | | -.02 | -.10 | -.03 | | | -.06 | | | -- | | | | | .30 |
| DM | .02 | -- | -- | -- | -- | .50 | | | | -- | -.04 | -.01 | | | -.01 | | | -- | | | | | .45 |
| DB | | | | | | -.18 | .50 | -.77 | .50 | | | | | | | | | | | | | | .05 |
| DC | | | | | | -.25 | -.19 | .68 | -.19 | | | | | | | | | | | | | | .05 |
| DP | | | | | | -.28 | .72 | -1.11 | .72 | | | | | | | | | | | | | | .05 |
| WH | +KEY+ | | | | | | | | | .60 | -.25 | -.06 | -- | .05 | | | -.03 | | | -- | -.01 | -- | .31 |
| CN | +---------- | | | | | | | | | -.09 | .48 | -- | -- | -.07 | | | -- | | | -- | -- | -- | .29 |
| CG | \| BF BeeF, veal | | | | | CG other Coarse Grains | | | | -.10 | -.03 | .60 | -- | -.09 | | | -.05 | | | -- | -- | -- | .32 |
| RI | \| PK PorK | | | | | RI RIce | | | | -- | -- | -- | .40 | -- | | | -- | | | -- | -- | -- | .40 |
| SB | \| ML Mutton, Lamb | | | | | SB SoyBeans | | | | .03 | -.15 | -.04 | -- | .60 | | | -- | | | -.11 | -- | -.01 | .34 |
| SM | \| PM Poultry Meat | | | | | SM SoyMeal | | | | | | | | -.38 | .30 | .13 | | | | | | | .05 |
| SO | \| PE Poultry Eggs | | | | | SO SoyOil | | | | | | | | -.38 | .30 | .13 | | | | | | | .05 |
| OS | \| DM Dairy - Milk | | | | | OS Other oilSeeds | | | | -.09 | -- | -.11 | -- | -- | | | .55 | | | -.08 | -- | -- | .21 |
| OM | \| DB Dairy - Butter | | | | | OM Other Meals | | | | | | | | | | | -.69 | .30 | .44 | | | | .05 |
| OO | \| DC Dairy - Cheese | | | | | OO Other Oils | | | | | | | | | | | -.69 | .30 | .44 | | | | .05 |
| CT | \| DP Dairy - Powder | | | | | CT CoTton | | | | -- | -- | -- | -- | -.25 | | | -.04 | | | .74 | -- | -- | .45 |
| SU | \| WH WHeat | | | | | SU SUgar | | | | -.09 | -- | -- | -- | -- | | | -- | | | -- | .50 | -- | .45 |
| TB | \| CN CorN | | | | | TB ToBacco | | | | -- | -- | -- | -- | -.05 | | | -- | | | -- | -- | .25 | .20 |
| | +---------- | | | | | | | | | | | | | | | | | | | | | | |

| Demand | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | -.70 | .05 | -- | .03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.62 |
| PK | .10 | -.86 | -- | .03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.72 |
| ML | -- | .16 | -.70 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.54 |
| PM | .08 | .04 | -- | -.56 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.44 |
| PE | -- | -- | -- | -- | -.35 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.35 |
| DM | -- | -- | -- | -- | -- | -.11 | -- | .04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.06 |
| DB | -- | -- | -- | -- | -- | | -.63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.63 |
| DC | -- | -- | -- | -- | -- | | -- | -.60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.60 |
| DP | -- | -- | -- | -- | -- | | -- | -- | -.65 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.65 |
| WH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.35 | .15 | .10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.10 |
| CN | -- | -- | -- | -- | -- | -- | -- | -- | -- | .05 | -.21 | .05 | -- | -- | .02 | -- | -- | -- | -- | -- | .01 | -- | -.08 |
| CG | -- | -- | -- | -- | -- | -- | -- | -- | -- | .13 | .20 | -.47 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.14 |
| RI | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.25 |
| SB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.48 | .30 | .13 | -- | | | -- | -- | -- | -.05 |
| SM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .05 | -- | -- | | -.31 | -- | -- | .05 | -- | -- | -- | -- | -.21 |
| SO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -.37 | -- | -- | .15 | -- | -- | -- | -.22 |
| OS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | -.37 | .12 | .17 | -- | -- | -- | -.09 |
| OM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .62 | -- | | -.90 | -- | -- | -- | -- | -.28 |
| OO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .33 | | -- | -.69 | -- | -- | -- | -.36 |
| CT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 | -- | -- | -.20 |
| SU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.24 | -- | -.22 |
| TB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 | -.20 |

Appendix table B2: Canada--Supply and demand elasticity matrices

| Supply | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | .50 | -.03 | -- | -- | -- | .05 | | | | -- | -.02 | -.04 | | | -- | | | -- | | | | | .45 |
| PK | -.05 | 1.50 | -- | -.05 | -- | -- | | | | -.24 | -.15 | -.23 | | | -.19 | | | -.06 | | | | | .53 |
| ML | -- | -- | .50 | -- | -- | -- | | | | -- | -- | -- | | | -- | | | -- | | | | | .50 |
| PM | -- | -.09 | -- | .70 | -- | -- | | | | -.27 | -.04 | -.05 | | | -- | | | -- | | | | | .25 |
| PE | -- | -- | -- | -- | .50 | -- | | | | -.19 | -.02 | -.03 | | | -.02 | | | -- | | | | | .24 |
| DM | .04 | -- | -- | -- | -- | .45 | | | | -- | -- | -.01 | | | -.01 | | | -- | | | | | .45 |
| DB | | | | | | -.17 | .34 | -.46 | .34 | | | | | | | | | | | | | | .05 |
| DC | | | | | | -.21 | -.30 | .85 | -.30 | | | | | | | | | | | | | | .05 |
| DP | | | | | | -.30 | .54 | -.73 | .54 | | | | | | | | | | | | | | .05 |
| WH | KEY+ | | | | | | | | | .50 | -- | -.15 | -- | -- | | | -.15 | | | -- | -- | -- | .20 |
| CN | +---------- | | | | | | | | | -- | .23 | -- | -- | -.03 | | | -- | | | -- | -- | -- | .20 |
| CG | BF | BeeF, veal | | | CG | other Coarse Grains | | | | -.33 | -- | .75 | -- | -- | | | -.11 | | | -- | -- | -- | .22 |
| RI | PK | PorK | | | RI | RIce | | | | -- | -- | | .10 | -- | | | -- | | | -- | -- | -- | .10 |
| SB | ML | Mutton, Lamb | | | SB | SoyBeans | | | | -.09 | -- | -- | | .35 | | | -- | | | -- | -- | -- | .17 |
| SM | PM | Poultry Meat | | | SM | SoyMeal | | | | | | | | -.37 | .30 | .12 | | | | | | | .05 |
| SO | PE | Poultry Eggs | | | SO | SoyOil | | | | | | | | -.37 | .30 | .12 | | | | | | | .05 |
| OS | DM | Dairy - Milk | | | OS | Other oilSeeds | | | | -.34 | -- | -.05 | -- | -- | | | .85 | | | -- | -- | -- | .61 |
| OM | DB | Dairy - Butter | | | OM | Other Meals | | | | | | | | | | | -.97 | .30 | .72 | | | | .05 |
| OO | DC | Dairy - Cheese | | | OO | Other Oils | | | | | | | | | | | -.97 | .30 | .72 | | | | .05 |
| CT | DP | Dairy - Powder | | | CT | CoTton | | | | -- | -- | -- | -- | | | | -- | | | .10 | -- | -- | .10 |
| SU | WH | WHeat | | | SU | SUgar | | | | -- | -- | -- | -- | | | | -- | | | -- | .30 | -- | .30 |
| TB | CN | CorN | | | TB | ToBacco | | | | -- | -- | -- | -- | | | | -- | | | -- | -- | .20 | .20 |
| | +---------- | | | | | | | | | | | | | | | | | | | | | | |

| Demand | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | -.80 | .06 | -- | .03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.71 |
| PK | .13 | -.86 | -- | .03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.70 |
| ML | -- | .11 | -1.00 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.89 |
| PM | .09 | .04 | -- | -.67 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.54 |
| PE | -- | -- | -- | -- | -.30 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.30 |
| DM | -- | -- | -- | -- | -- | -.11 | .01 | .03 | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.05 |
| DB | -- | -- | -- | -- | -- | | -.70 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.70 |
| DC | -- | -- | -- | -- | -- | | -- | -.72 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.72 |
| DP | -- | -- | -- | -- | -- | | -- | -- | -.50 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.50 |
| WH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 | .02 | .06 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.13 |
| CN | -- | -- | -- | -- | -- | -- | -- | -- | -- | .07 | -.21 | .09 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.05 |
| CG | -- | -- | -- | -- | -- | -- | -- | -- | -- | .13 | .06 | -.22 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.02 |
| RI | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.25 |
| SB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.47 | .30 | .12 | -- | | | -- | -- | -- | -.05 |
| SM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -.40 | -- | -- | .30 | -- | -- | -- | -- | -.10 |
| SO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -.40 | -- | -- | .20 | -- | -- | -- | -.20 |
| OS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | -.37 | .09 | .23 | -- | -- | -- | -.05 |
| OM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .04 | -- | -- | .88 | -- | | -1.00 | -- | -- | -- | -- | -.08 |
| OO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .05 | | -- | -.60 | -- | -- | -- | -.55 |
| CT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.25 | -- | -- | -.25 |
| SU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.24 | -- | -.24 |
| TB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 | -.20 |

Appendix table B3: European Community (12)--Supply and demand elasticity matrices

| Supply | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | .56 | -.07 | -- | -- | -- | .15 | | | | -.01 | -- | -.02 | | | -- | | | -- | | | | | .58 |
| PK | -.10 | .89 | -- | -.01 | -- | -- | | | | -.11 | -.07 | -.12 | | | -.07 | | | -.03 | | | | | .38 |
| ML | -- | -- | .69 | -- | -- | -.07 | | | | -.02 | -.02 | -.04 | | | -.01 | | | -- | | | | | .53 |
| PM | -- | -.03 | -- | .78 | -.04 | -- | | | | -.05 | -.06 | -.09 | | | -.08 | | | -.03 | | | | | .41 |
| PE | -- | -- | -- | -.03 | .74 | -- | | | | -.05 | -.04 | -.08 | | | -.05 | | | -.03 | | | | | .46 |
| DM | .12 | -- | -- | -- | -- | .65 | | | | -.02 | -.02 | -.03 | | | -.02 | | | -.01 | | | | | .64 |
| DB | | | | | | -.11 | .23 | -.31 | .23 | | | | | | | | | | | | | | .05 |
| DC | | | | | | -.18 | -.15 | .53 | -.15 | | | | | | | | | | | | | | .05 |
| DP | | | | | | -.21 | .38 | -.50 | .38 | | | | | | | | | | | | | | .05 |
| WH | +KEY+ | | | | | | | | | .52 | -.05 | -.17 | -- | -- | | | -.05 | | | -- | -- | -- | .24 |
| CN | +---------- | | | | | | | | | -.21 | .61 | -.17 | -- | -- | | | -- | | | -- | -- | -- | .30 |
| CG | \| BF | BeeF, veal | | | CG | other Coarse Grains | | | \| | -.31 | -.09 | .57 | -- | -- | | | -.03 | | | -- | -- | -- | .20 |
| RI | \| PK | PorK | | | RI | RIce | | | \| | -- | -- | -- | .40 | -- | | | -- | | | -- | -- | -- | .40 |
| SB | \| ML | Mutton, Lamb | | | SB | SoyBeans | | | \| | -- | -- | -- | -- | .40 | | | -.10 | | | -- | -- | -- | .30 |
| SM | \| PM | Poultry Meat | | | SM | SoyMeal | | | \| | | | | | -.37 | .30 | .12 | | | | | | | .05 |
| SO | \| PE | Poultry Eggs | | | SO | SoyOil | | | \| | | | | | -.37 | .30 | .12 | | | | | | | .05 |
| OS | \| DM | Dairy - Milk | | | OS | Other oilSeeds | | | \| | -.19 | -- | -.07 | -- | -.01 | | | .71 | | | -- | -- | -- | .45 |
| OM | \| DB | Dairy - Butter | | | OM | Other Meals | | | \| | | | | | | | | -.27 | .07 | .25 | | | | .05 |
| OO | \| DC | Dairy - Cheese | | | OO | Other Oils | | | \| | | | | | | | | -.27 | .07 | .25 | | | | .05 |
| CT | \| DP | Dairy - Powder | | | CT | CoTton | | | \| | -- | -- | -- | -- | -- | | | -- | | | .24 | -- | -- | .24 |
| SU | \| WH | WHeat | | | SU | SUgar | | | \| | -.02 | -- | -.01 | -- | -- | | | -- | | | -- | .17 | -- | .14 |
| TB | \| CN | CorN | | | TB | ToBacco | | | \| | -- | -- | -- | -- | -- | | | -- | | | -- | -- | .20 | .20 |
| | +---------- | | | | | | | | | | | | | | | | | | | | | | |

| Demand | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | -.70 | .21 | -- | .03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.46 |
| PK | .24 | -.77 | .02 | .04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.48 |
| ML | .03 | .07 | -.87 | .10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.67 |
| PM | .08 | .10 | .07 | -.88 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.63 |
| PE | -- | -- | -- | -- | -.20 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 |
| DM | -- | -- | -- | -- | -- | -.10 | .01 | .05 | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.03 |
| DB | -- | -- | -- | -- | -- | | -.43 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.42 |
| DC | -- | -- | -- | -- | -- | | -- | -.40 | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.38 |
| DP | -- | -- | -- | -- | -- | | .02 | .08 | -.39 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.29 |
| WH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.28 | .06 | .08 | .01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.13 |
| CN | -- | -- | -- | -- | -- | -- | -- | -- | -- | .17 | -.44 | .14 | -- | -- | .02 | -- | -- | -- | -- | -- | -- | -- | -.09 |
| CG | -- | -- | -- | -- | -- | -- | -- | -- | -- | .13 | .08 | -.35 | -- | -- | .02 | -- | -- | -- | -- | -- | -- | -- | -.11 |
| RI | -- | -- | -- | -- | -- | -- | -- | -- | -- | .17 | -- | -- | -.47 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.30 |
| SB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.39 | .24 | .10 | -- | | | -- | -- | -- | -.05 |
| SM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .02 | .03 | -- | | -.37 | -- | -- | .17 | -- | -- | -- | -- | -.14 |
| SO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -.57 | -- | -- | .38 | -- | -- | -- | -.19 |
| OS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | -.63 | .13 | .45 | -- | -- | -- | -.05 |
| OM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .03 | .04 | -- | -- | .39 | -- | | -.68 | -- | -- | -- | -- | -.23 |
| OO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .06 | | -- | -.57 | -- | -- | -- | -.51 |
| CT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.51 | -- | -- | -.51 |
| SU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.48 | -- | -.48 |
| TB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.46 | -.46 |

Appendix table B4: Other Western Europe--Supply and demand elasticity matrices

| Supply | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | .57 | -.07 | -- | -- | -- | .19 | | | | -- | -.01 | -.04 | | | -- | | | -- | | | | | .62 |
| PK | -.05 | .80 | -- | -- | -- | -- | | | | -.03 | -.03 | -.11 | | | -.01 | | | -- | | | | | .55 |
| ML | -- | -- | .80 | -.04 | -- | -- | | | | -- | -.08 | -.31 | | | -.04 | | | -.02 | | | | | .31 |
| PM | -- | -.01 | -- | .75 | -.02 | -- | | | | -.11 | -.02 | -.06 | | | -.04 | | | -.02 | | | | | .47 |
| PE | -- | -- | -- | -.01 | .75 | -- | | | | -.05 | -.05 | -.16 | | | -.02 | | | -- | | | | | .45 |
| DM | .08 | -- | -- | -- | -- | .60 | | | | -- | -.01 | -.04 | | | -- | | | -- | | | | | .62 |
| DB | | | | | | -.13 | .24 | -.30 | .24 | | | | | | | | | | | | | | .05 |
| DC | | | | | | -.20 | -.13 | .52 | -.13 | | | | | | | | | | | | | | .05 |
| DP | | | | | | -.25 | .40 | -.50 | .40 | | | | | | | | | | | | | | .05 |
| WH | +KEY+ | | | | | | | | | .80 | -.05 | -.40 | -- | -- | | | -- | | | -- | -- | -- | .35 |
| CN | +---------- | | | | | | | | + | -.15 | .60 | -.20 | -- | -- | | | -- | | | -- | -- | -- | .27 |
| CG | \| BF | BeeF, veal | | CG | other Coarse Grains | | | | \| | -.23 | -.05 | .50 | -- | -- | | | -- | | | -- | -- | -- | .19 |
| RI | \| PK | PorK | | RI | RIce | | | | \| | -- | -- | -- | .20 | -- | | | -- | | | -- | -- | -- | .20 |
| SB | \| ML | Mutton, Lamb | | SB | SoyBeans | | | | \| | -- | -- | -- | -- | .45 | | | -- | | | -- | -- | -- | .45 |
| SM | \| PM | Poultry Meat | | SM | SoyMeal | | | | \| | | | | | -.37 | .30 | .12 | | | | | | | .05 |
| SO | \| PE | Poultry Eggs | | SO | SoyOil | | | | \| | | | | | -.37 | .30 | .12 | | | | | | | .05 |
| OS | \| DM | Dairy - Milk | | OS | Other oilSeeds | | | | \| | -- | -- | -- | -- | -- | | | .30 | | | -- | -- | -- | .30 |
| OM | \| DB | Dairy - Butter | | OM | Other Meals | | | | \| | | | | | | | | -.63 | .20 | .48 | | | | .05 |
| OO | \| DC | Dairy - Cheese | | OO | Other Oils | | | | \| | | | | | | | | -.63 | .20 | .48 | | | | .05 |
| CT | \| DP | Dairy - Powder | | CT | CoTton | | | | \| | -- | -- | -- | -- | -- | | | -- | | | .20 | -- | -- | .20 |
| SU | \| WH | WHeat | | SU | SUgar | | | | \| | -- | -- | -- | -- | -- | | | -- | | | -- | .45 | -- | .45 |
| TB | \| CN | CorN | | TB | ToBacco | | | | \| | -- | -- | -- | -- | -- | | | -- | | | -- | -- | .20 | .20 |
| | +---------- | | | | | | | | + | | | | | | | | | | | | | | |

| Demand | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | -.70 | .18 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.52 |
| PK | .08 | -.60 | -- | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.50 |
| ML | -- | -- | -.47 | .01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.46 |
| PM | -- | .22 | -- | -.65 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.43 |
| PE | -- | -- | -- | -- | -.35 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.35 |
| DM | -- | -- | -- | -- | -- | -.16 | .02 | .08 | .03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.02 |
| DB | -- | -- | -- | -- | -- | | -.45 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.45 |
| DC | -- | -- | -- | -- | -- | | -- | -.48 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.48 |
| DP | -- | -- | -- | -- | -- | | -- | -- | -.40 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.40 |
| WH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.35 | .02 | .15 | .01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.17 |
| CN | -- | -- | -- | -- | -- | -- | -- | -- | -- | .05 | -.75 | .40 | -- | -- | .04 | -- | -- | .01 | -- | -- | -- | -- | -.25 |
| CG | -- | -- | -- | -- | -- | -- | -- | -- | -- | .10 | .11 | -.45 | -- | -- | .01 | -- | -- | -- | -- | -- | -- | -- | -.23 |
| RI | -- | -- | -- | -- | -- | -- | -- | -- | -- | .11 | -- | -- | -.44 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.33 |
| SB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.40 | .25 | .10 | -- | | | -- | -- | -- | -.05 |
| SM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .09 | .08 | -- | | -.55 | -- | -- | .01 | -- | -- | -- | -- | -.37 |
| SO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -.45 | -- | -- | .20 | -- | -- | -- | -.25 |
| OS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | -.53 | .14 | .34 | -- | -- | -- | -.05 |
| OM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .05 | .09 | -- | -- | .02 | -- | | -.55 | -- | -- | -- | -- | -.40 |
| OO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .05 | | -- | -.50 | -- | -- | -- | -.45 |
| CT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 | -- | -- | -.20 |
| SU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.29 | -- | -.29 |
| TB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.50 | -.50 |

Appendix table B5: Japan--Supply and demand elasticity matrices

| Supply | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | .40 | -.10 | -- | -.06 | -- | .27 | | | | -- | -.01 | -- | | | -- | | | -- | | | | | .48 |
| PK | -.11 | .83 | -- | -.06 | -- | -- | | | | -- | -.07 | -.04 | | | -.04 | | | -.01 | | | | | .50 |
| ML | -- | -- | .45 | -- | -- | -- | | | | -- | -- | -- | | | -- | | | -- | | | | | .45 |
| PM | -.15 | -.14 | -- | 1.27 | -.03 | -- | | | | -- | -.16 | -.09 | | | -.07 | | | -.03 | | | | | .61 |
| PE | -- | -- | -- | -.01 | .80 | -- | | | | -- | -.07 | -.04 | | | -.03 | | | -.01 | | | | | .64 |
| DM | .33 | -- | -- | -- | -- | .40 | | | | -- | -- | -- | | | -- | | | -- | | | | | .70 |
| DB | | | | | | -.20 | .15 | -.05 | .15 | | | | | | | | | | | | | | .05 |
| DC | | | | | | -.18 | -.44 | 1.10 | -.44 | | | | | | | | | | | | | | .05 |
| DP | | | | | | -.16 | .13 | -.04 | .13 | | | | | | | | | | | | | | .05 |
| WH | +KEY+ | | | | | | | | | .52 | -- | -.08 | -.10 | -- | | | -- | | | -- | -- | -- | .34 |
| CN | +---------- | | | | | | | | | -- | .30 | -- | -- | -- | | | -- | | | -- | -- | -- | .30 |
| CG | BF | BeeF, veal | | | CG | other Coarse Grains | | | | -.28 | -- | .55 | -.12 | -- | | | -- | | | -- | -- | -- | .20 |
| RI | PK | PorK | | | RI | RIce | | | | -- | -- | -- | .50 | -- | | | -- | | | -- | -- | -- | .49 |
| SB | ML | Mutton, Lamb | | | SB | SoyBeans | | | | -- | -- | -- | -.25 | .65 | | | -.01 | | | -- | -- | -- | .39 |
| SM | PM | Poultry Meat | | | SM | SoyMeal | | | | | | | | -.38 | .30 | .13 | | | | | | | .05 |
| SO | PE | Poultry Eggs | | | SO | SoyOil | | | | | | | | -.38 | .30 | .13 | | | | | | | .05 |
| OS | DM | Dairy - Milk | | | OS | Other oilSeeds | | | | -- | -- | -- | -.30 | -.30 | | | .90 | | | -- | -- | -- | .29 |
| OM | DB | Dairy - Butter | | | OM | Other Meals | | | | | | | | | | | -.56 | .18 | .43 | | | | .05 |
| OO | DC | Dairy - Cheese | | | OO | Other Oils | | | | | | | | | | | -.56 | .18 | .43 | | | | .05 |
| CT | DP | Dairy - Powder | | | CT | CoTton | | | | -- | -- | -- | -- | -- | | | -- | | | -- | -- | -- | -- |
| SU | WH | WHeat | | | SU | SUgar | | | | -- | -- | -- | -- | -- | | | -- | | | -- | .45 | -- | .45 |
| TB | CN | CorN | | | TB | ToBacco | | | | -- | -- | -- | -- | -- | | | -- | | | -- | -- | .20 | .20 |
| | +---------- | | | | | | | | | | | | | | | | | | | | | | |
| Demand | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
| BF | -1.00 | .26 | -- | .10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.64 |
| PK | .32 | -.95 | -- | .08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.55 |
| ML | -- | -- | -.35 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.35 |
| PM | .32 | .21 | -- | -1.10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.57 |
| PE | -- | -- | -- | -- | -.30 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.30 |
| DM | -- | -- | -- | -- | -- | -.13 | .01 | -- | .01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.10 |
| DB | -- | -- | -- | -- | -- | | -.54 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.54 |
| DC | -- | -- | -- | -- | -- | | -- | -.68 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.68 |
| DP | -- | -- | -- | -- | -- | | -- | -- | -.63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.63 |
| WH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.40 | .10 | .01 | .12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.17 |
| CN | -- | -- | -- | -- | -- | -- | -- | -- | -- | .12 | -.50 | .20 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.18 |
| CG | -- | -- | -- | -- | -- | -- | -- | -- | -- | .03 | .45 | -.55 | .08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| RI | -- | -- | -- | -- | -- | -- | -- | -- | -- | .01 | -- | -- | -.27 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.25 |
| SB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.18 | .09 | .04 | -- | | | -- | -- | -- | -.06 |
| SM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -.35 | -- | -- | .20 | -- | -- | -- | -- | -.15 |
| SO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -.47 | -- | -- | .39 | -- | -- | -- | -.08 |
| OS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | -.48 | .13 | .30 | -- | -- | -- | -.05 |
| OM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .55 | -- | | -.75 | -- | -- | -- | -- | -.20 |
| OO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .16 | | -- | -.35 | -- | -- | -- | -.19 |
| CT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.30 | -- | -- | -.30 |
| SU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.54 | -- | -.54 |
| TB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.50 | -.50 |

## Appendix table B6: Australia--Supply and demand elasticity matrices

| Supply | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | .70 | -.03 | -.10 | -.01 | -- | -.05 | | | | -- | -- | -.01 | | | -- | | | -- | | | | | .50 |
| PK | -.09 | .80 | -- | -- | -- | -- | | | | -- | -- | -.07 | | | -.01 | | | -.03 | | | | | .58 |
| ML | -.30 | -- | .70 | -- | -- | -.05 | | | | -- | -- | -.02 | | | -- | | | -- | | | | | .32 |
| PM | -.05 | -- | -- | .80 | -.02 | -- | | | | -.01 | -- | -.04 | | | -- | | | -- | | | | | .68 |
| PE | -- | -- | -- | -.02 | .60 | -- | | | | -- | -- | -.06 | | | -- | | | -.02 | | | | | .49 |
| DM | -.06 | -- | -.02 | -- | -- | .50 | | | | -- | -- | -- | | | -- | | | -- | | | | | .41 |
| DB | | | | | | -.30 | .65 | -.95 | .65 | | | | | | | | | | | | | | .05 |
| DC | | | | | | -.28 | -.47 | 1.26 | -.47 | | | | | | | | | | | | | | .05 |
| DP | | | | | | -.28 | .61 | -.88 | .61 | | | | | | | | | | | | | | .05 |
| WH | +KEY+ | | -.10 | | | | | | | .90 | -- | -.20 | -- | -- | | | -.05 | | | -.04 | -- | -- | .60 |
| CN | + | | | | | | | | | -.04 | .80 | -.32 | -- | -- | | | -- | | | -- | -- | -- | .45 |
| CG | \| BF | BeeF, veal | | | CG | other Coarse Grains | | | | -.71 | -.02 | .83 | -- | -- | | | -- | | | -- | -- | -- | .21 |
| RI | \| PK | PorK | | | RI | RIce | | | | -.11 | -- | -- | .60 | -- | | | -- | | | -- | -- | -- | .46 |
| SB | \| ML | Mutton, Lamb | | | SB | SoyBeans | | | | -- | -- | -- | -- | .50 | | | -.30 | | | -- | -- | -- | .20 |
| SM | \| PM | Poultry Meat | | | SM | SoyMeal | | | | | | | | -.38 | .30 | .13 | | | | | | | .05 |
| SO | \| PE | Poultry Eggs | | | SO | SoyOil | | | | | | | | -.38 | .30 | .13 | | | | | | | .05 |
| OS | \| DM | Dairy - Milk | | | OS | Other oilSeeds | | | | -.44 | -- | -- | -- | -.04 | | | .60 | | | -- | -- | -- | .24 |
| OM | \| DB | Dairy - Butter | | | OM | Other Meals | | | | | | | | | | | -.70 | .25 | .50 | | | | .05 |
| OO | \| DC | Dairy - Cheese | | | OO | Other Oils | | | | | | | | | | | -.70 | .25 | .50 | | | | .05 |
| CT | \| DP | Dairy - Powder | | | CT | CoTton | | | | -.34 | -- | -- | -- | -- | | | -- | | | .50 | -- | -- | .02 |
| SU | \| WH | WHeat | | | SU | SUgar | | | | -- | -- | -- | -- | -- | | | -- | | | -- | .50 | -- | .50 |
| TB | \| CN | CorN | | | TB | ToBacco | | | | -- | -- | -- | -- | -- | | | -- | | | -- | -- | .50 | .50 |
| | + | | | | | | | | | | | | | | | | | | | | | | |

| Demand | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | -.78 | .10 | .15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.53 |
| PK | .11 | -1.02 | .18 | .15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.58 |
| ML | .29 | .31 | -1.20 | .17 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.44 |
| PM | -- | .26 | .17 | -.80 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.36 |
| PE | -- | -- | -- | -- | -.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.25 |
| DM | -- | -- | -- | -- | -- | -.18 | .05 | .08 | .04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| DB | -- | -- | -- | -- | -- | | -.45 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.45 |
| DC | -- | -- | -- | -- | -- | | -- | -.40 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.40 |
| DP | -- | -- | -- | -- | -- | | -- | -- | -.45 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.45 |
| WH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.24 | -- | .04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 |
| CN | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.35 | .15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 |
| CG | -- | -- | -- | -- | -- | -- | -- | -- | -- | .01 | .01 | -.36 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.34 |
| RI | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.45 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.45 |
| SB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.40 | .25 | .11 | -- | | | -- | -- | -- | -.05 |
| SM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -.60 | -- | -- | .35 | -- | -- | -- | -- | -.25 |
| SO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -.93 | -- | -- | .70 | -- | -- | -- | -.23 |
| OS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | -.48 | .14 | .28 | -- | -- | -- | -.06 |
| OM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .17 | -- | | -.44 | -- | -- | -- | -- | -.27 |
| OO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .07 | | -- | -.65 | -- | -- | -- | -.58 |
| CT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 | -- | -- | -.20 |
| SU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.25 | -- | -.25 |
| TB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.50 | -.50 |

## Appendix table B7: New Zealand--Supply and demand elasticity matrices

| Supply | BF | PK | ML | PM | DM | DB | DC | DP | WH | CN | CG | SB | SM | SO | OS | OM | OO | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | .45 | -.02 | -.06 | -- | .10 | | | | -- | -- | -- | | -- | | | -- | | | | .46 |
| PK | -.10 | .80 | -.05 | -- | -- | | | | -.02 | -.01 | -.02 | | -- | | | -- | | | | .60 |
| ML | -.05 | -- | .90 | -.01 | -.10 | | | | -- | -- | -.01 | | -- | | | -- | | | | .71 |
| PM | -- | -- | -.13 | .80 | -- | | | | -.03 | -.01 | -.02 | | -- | | | -- | | | | .60 |
| DM | .04 | -- | -.05 | -- | .60 | | | | -- | -- | -- | | -- | | | -- | | | | .58 |
| DB | | | | | -.28 | .34 | -.35 | .34 | | | | | | | | | | | | .05 |
| DC | | | | | -.29 | -.63 | 1.61 | -.63 | | | | | | | | | | | | .05 |
| DP | | | | | -.31 | .37 | -.38 | .37 | | | | | | | | | | | | .05 |
| WH | +KEY+ | | | | | | | | .80 | -.06 | -.13 | -- | | | -- | | | -- | -- | .61 |
| CN | +---------- | | | | | | | | -.12 | .90 | -.30 | -- | | | -- | | | -- | -- | .48 |
| CG | \| BF BeeF, veal | | | | CG other Coarse Grains | | | | -.11 | -.12 | .80 | -- | | | -- | | | -- | -- | .57 |
| | \| PK PorK | | | | RI RIce | | | | | | | | | | | | | | | |
| SB | \| ML Mutton, Lamb | | | | SB SoyBeans | | | | -- | -- | -- | .30 | | | -.10 | | | -- | -- | .20 |
| SM | \| PM Poultry Meat | | | | SM SoyMeal | | | | | | | -.15 | .07 | .13 | | | | | | .05 |
| SO | \| PE Poultry Eggs | | | | SO SoyOil | | | | | | | -.15 | .07 | .13 | | | | | | .05 |
| OS | \| DM Dairy - Milk | | | | OS Other oilSeeds | | | | -- | -- | -- | -.06 | | | .25 | | | -- | -- | .19 |
| OM | \| DB Dairy - Butter | | | | OM Other Meals | | | | | | | | | | -1.28 | .30 | 1.03 | | | .05 |
| OO | \| DC Dairy - Cheese | | | | OO Other Oils | | | | | | | | | | -1.28 | .30 | 1.03 | | | .05 |
| | \| DP Dairy - Powder | | | | CT CoTton | | | | | | | | | | | | | | | |
| SU | \| WH WHeat | | | | SU SUgar | | | | -- | -- | -- | -- | | | -- | | | .20 | -- | .20 |
| TB | \| CN CorN | | | | TB ToBacco | | | | -- | -- | -- | -- | | | -- | | | -- | .20 | .20 |
| | +---------- | | | | | | | | | | | | | | | | | | | |

| Demand | BF | PK | ML | PM | DM | DB | DC | DP | WH | CN | CG | SB | SM | SO | OS | OM | OO | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | -.60 | .08 | .25 | .03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.24 |
| PK | .08 | -.55 | .06 | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.39 |
| ML | .40 | .10 | -.60 | .01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.09 |
| PM | .07 | .05 | .02 | -.60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.46 |
| DM | -- | -- | -- | -- | -.22 | .09 | .05 | .09 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| DB | -- | -- | -- | -- | | -.45 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.45 |
| DC | -- | -- | -- | -- | | -- | -.40 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.40 |
| DP | -- | -- | -- | -- | | -- | -- | -.45 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.45 |
| WH | -- | -- | -- | -- | -- | -- | -- | -- | -.22 | -- | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -.20 |
| CN | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.44 | .25 | -- | -- | -- | -- | -- | -- | -- | -- | -.19 |
| CG | -- | -- | -- | -- | -- | -- | -- | -- | .03 | .12 | -.32 | -- | -- | -- | -- | -- | -- | -- | -- | -.17 |
| SB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.41 | .13 | .23 | -- | | | -- | -- | -.05 |
| SM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -.40 | -- | -- | .11 | -- | -- | -- | -.29 |
| SO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -.90 | -- | -- | .35 | -- | -- | -.55 |
| OS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | -.37 | .05 | .18 | -- | -- | -.13 |
| OM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .49 | -- | | -.62 | -- | -- | -- | -.13 |
| OO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .17 | | -- | -.70 | -- | -- | -.53 |
| SU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 | -- | -.20 |
| TB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.50 | -.50 |

Appendix table B8: Developing Country Exporters--Supply and demand elasticity matrices

| Supply | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | .50 | -.01 | -- | -- | -- | -- | | | | -- | -.04 | -- | | | -- | | | -- | | | | | .44 |
| PK | -.03 | .57 | -- | -- | -- | -- | | | | -- | -.06 | -- | | | -.03 | | | -- | | | | | .45 |
| ML | -- | -- | .42 | -- | -- | -- | | | | -- | -.02 | -.01 | | | -- | | | -- | | | | | .38 |
| PM | -- | -- | -- | .62 | -- | -- | | | | -- | -.12 | -- | | | -.08 | | | -.01 | | | | | .39 |
| PE | -- | -- | -- | -- | .49 | -- | | | | -- | -.09 | -- | | | -.03 | | | -- | | | | | .35 |
| DM | -.01 | -- | -- | -- | -- | .48 | | | | -- | -.07 | -- | | | -.01 | | | -- | | | | | .37 |
| DB | | | | | | -.11 | .33 | -.50 | .33 | | | | | | | | | | | | | | .05 |
| DC | | | | | | -.27 | -.09 | .50 | -.09 | | | | | | | | | | | | | | .05 |
| DP | | | | | | -.37 | .87 | -1.32 | .87 | | | | | | | | | | | | | | .05 |
| WH | +KEY+ | | | | | | | | | .52 | -.08 | -.03 | -- | .06 | | | -.03 | | | -- | -- | -- | .43 |
| CN | +---------- | | | | | | | | | -.03 | .51 | -.02 | -.04 | -.06 | | | -.01 | | | -.01 | -.01 | -- | .33 |
| CG | \| BF | BeeF, veal | | | CG | other Coarse Grains | | | | -.22 | -.28 | .77 | -.01 | -.04 | | | -.04 | | | -- | -- | -- | .18 |
| RI | \| PK | PorK | | | RI | RIce | | | | | -.02 | -- | .32 | -.01 | | | -- | | | -- | -.01 | -- | .28 |
| SB | \| ML | Mutton, Lamb | | | SB | SoyBeans | | | | .03 | -.06 | -- | -.02 | .56 | | | -.07 | | | -.03 | -.03 | -- | .36 |
| SM | \| PM | Poultry Meat | | | SM | SoyMeal | | | | | | | | -.38 | .30 | .13 | | | | | | | .05 |
| SO | \| PE | Poultry Eggs | | | SO | SoyOil | | | | | | | | -.38 | .30 | .13 | | | | | | | .05 |
| OS | \| DM | Dairy - Milk | | | OS | Other oilSeeds | | | | -.02 | -.02 | -- | -- | -.14 | | | .51 | | | -.02 | -- | -- | .30 |
| OM | \| DB | Dairy - Butter | | | OM | Other Meals | | | | | | | | | | | -.21 | .03 | .23 | | | | .05 |
| OO | \| DC | Dairy - Cheese | | | OO | Other Oils | | | | | | | | | | | -.21 | .03 | .23 | | | | .05 |
| CT | \| DP | Dairy - Powder | | | CT | CoTton | | | | | -.08 | -- | -- | -.24 | | | -.08 | | | .66 | -.02 | -- | .23 |
| SU | \| WH | WHeat | | | SU | SUgar | | | | | -.03 | -- | -.06 | -.08 | | | -- | | | -- | .52 | -- | .34 |
| TB | \| CN | CorN | | | TB | ToBacco | | | | | -.01 | -- | -- | -- | | | -- | | | -- | -- | .26 | .24 |
| | +---------- | | | | | | | | | | | | | | | | | | | | | | |

| Demand | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | -.64 | .08 | -- | .09 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.46 |
| PK | .17 | -.82 | -- | .13 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.52 |
| ML | .30 | -- | -.79 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.50 |
| PM | .32 | .20 | -- | -.78 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.26 |
| PE | -- | -- | -- | -- | -.50 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.50 |
| DM | -- | -- | -- | -- | -- | -.12 | -- | .04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.08 |
| DB | -- | -- | -- | -- | -- | | -.80 | .11 | .11 | -- | -- | -- | -- | -- | -- | .21 | -- | -- | .11 | -- | -- | -- | -.26 |
| DC | -- | -- | -- | -- | -- | | .02 | -.69 | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.65 |
| DP | -- | -- | -- | -- | -- | | .07 | .09 | -.87 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.71 |
| WH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.47 | .18 | .01 | .12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.16 |
| CN | -- | -- | -- | -- | -- | -- | -- | -- | -- | .11 | -.47 | .01 | .02 | -- | .07 | -- | -- | -- | -- | -- | -- | -- | -.25 |
| CG | -- | -- | -- | -- | -- | -- | -- | -- | -- | .09 | .17 | -.48 | -- | -- | .05 | -- | -- | .03 | -- | -- | -- | -- | -.14 |
| RI | -- | -- | -- | -- | -- | -- | -- | -- | -- | .01 | -- | -- | -.34 | -- | -- | -- | -- | -- | -- | -- | .02 | -- | -.30 |
| SB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.39 | .24 | .10 | -- | | | -- | -- | -- | -.05 |
| SM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .31 | .02 | -- | | -1.18 | -- | -- | .13 | -- | -- | -- | -- | -.72 |
| SO | -- | -- | -- | -- | -- | -- | .06 | -- | -- | -- | -- | -- | -- | | -- | -.91 | -- | -- | .07 | -- | -- | -- | -.78 |
| OS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | -.45 | .05 | .35 | -- | -- | -- | -.05 |
| OM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .06 | .04 | -- | -- | .58 | -- | | -1.09 | -- | -- | -- | -- | -.41 |
| OO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .01 | -- | -- | .02 | | -- | -.85 | -- | -- | -- | -.80 |
| CT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.51 | -- | -- | -.51 |
| SU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .11 | -- | -- | -- | -- | -- | -- | -- | -.67 | -- | -.57 |
| TB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.40 | -.40 |

Appendix table B9: Centrally Planned Countries--Supply and demand elasticity matrices

| Supply | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | .26 | -.04 | -- | -.01 | -- | .06 | | | | -- | -- | -- | | | -- | | | -- | | | | | .26 |
| PK | -.02 | .47 | -- | -- | -- | -- | | | | -.02 | -.03 | -.01 | | | -- | | | -- | | | | | .37 |
| ML | -- | -- | .29 | -- | -- | -- | | | | -.01 | -.02 | -.02 | | | -- | | | -- | | | | | .22 |
| PM | -.07 | -.02 | -- | .56 | -- | -- | | | | -.03 | -.07 | -.06 | | | -.03 | | | -.02 | | | | | .26 |
| PE | -- | -- | -- | -- | .28 | -- | | | | -.02 | -.01 | -.02 | | | -- | | | -- | | | | | .21 |
| DM | .08 | -- | -- | -- | -- | .23 | | | | -.01 | -- | -- | | | -- | | | -- | | | | | .27 |
| DB | | | | | | -.10 | .11 | -.07 | .11 | | | | | | | | | | | | | | .05 |
| DC | | | | | | -.17 | -.17 | .55 | -.17 | | | | | | | | | | | | | | .05 |
| DP | | | | | | -.33 | .28 | -.18 | .28 | | | | | | | | | | | | | | .05 |
| WH | +KEY+ | | | | | | | | | .20 | -.02 | -.03 | -.01 | -- | | | -- | | | -- | -- | -- | .14 |
| CN | +---------- | | | | | | | | | -.04 | .22 | -.03 | -.01 | -- | | | -- | | | -- | -- | -- | .14 |
| CG | \| BF BeeF, veal | | | | CG | other Coarse Grains | | | \| | -.04 | -.02 | .25 | -- | -- | | | -- | | | -- | -- | -- | .18 |
| RI | \| PK PorK | | | | RI | RIce | | | \| | | -- | -- | .15 | -- | | | -- | | | -- | -- | -- | .14 |
| SB | \| ML Mutton, Lamb | | | | SB | SoyBeans | | | \| | | -- | -.01 | -- | .12 | | | -.01 | | | -- | -- | -- | .10 |
| SM | \| PM Poultry Meat | | | | SM | SoyMeal | | | \| | | | | | -.35 | .30 | .10 | | | | | | | .05 |
| SO | \| PE Poultry Eggs | | | | SO | SoyOil | | | \| | | | | | -.35 | .30 | .10 | | | | | | | .05 |
| OS | \| DM Dairy - Milk | | | | OS | Other oilSeeds | | | \| | -.01 | -- | -- | -- | -- | | | .14 | | | -- | -- | -- | .12 |
| OM | \| DB Dairy - Butter | | | | OM | Other Meals | | | \| | | | | | | | | -.61 | .22 | .44 | | | | .05 |
| OO | \| DC Dairy - Cheese | | | | OO | Other Oils | | | \| | | | | | | | | -.61 | .22 | .44 | | | | .05 |
| CT | \| DP Dairy - Powder | | | | CT | CoTton | | | \| | | -- | -- | -- | -- | | | -- | | | .12 | -- | -- | .12 |
| SU | \| WH WHeat | | | | SU | SUgar | | | \| | | -- | -- | -- | -- | | | -- | | | -- | .17 | -- | .17 |
| TB | \| CN CorN | | | | TB | ToBacco | | | \| | | -- | -- | -- | -- | | | -- | | | -- | -- | .16 | .16 |
| | +---------- | | | | | | | | + | | | | | | | | | | | | | | |
| Demand | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
| BF | -.22 | .05 | -- | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.16 |
| PK | .01 | -.38 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.36 |
| ML | -- | -- | -.22 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.22 |
| PM | .06 | .08 | -- | -.34 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 |
| PE | -- | -- | -- | -- | -.13 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.13 |
| DM | -- | -- | -- | -- | -- | -.09 | .02 | .01 | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.04 |
| DB | -- | -- | -- | -- | -- | | -.15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.15 |
| DC | -- | -- | -- | -- | -- | | -- | -.15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.15 |
| DP | -- | -- | -- | -- | -- | | -- | -- | -.36 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.36 |
| WH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.20 | .02 | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.14 |
| CN | -- | -- | -- | -- | -- | -- | -- | -- | -- | .06 | -.22 | .04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.12 |
| CG | -- | -- | -- | -- | -- | -- | -- | -- | -- | .06 | .04 | -.26 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.15 |
| RI | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.12 |
| SB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.23 | .09 | .03 | -- | | | -- | -- | -- | -.11 |
| SM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .02 | .03 | -- | | -.36 | -- | -- | .06 | -- | -- | -- | -- | -.26 |
| SO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -.17 | -- | -- | .01 | -- | -- | -- | -.15 |
| OS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | -.38 | .11 | .21 | -- | -- | -- | -.06 |
| OM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .05 | -- | | -.29 | -- | -- | -- | -- | -.24 |
| OO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -.31 | -- | -- | -- | -.31 |
| CT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.13 | -- | -- | -.13 |
| SU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.26 | -- | -.26 |
| TB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.13 | -.13 |

Appendix table B10: Developing Asian Country Importers--Supply and demand elasticity matrices

| Supply | BF | PK | ML | PM | PE | | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | .50 | -.10 | -- | -- | -- | -- | -- | -.01 | -- | | | -- | | | -- | | | | | .37 |
| PK | -.03 | .64 | -- | -- | -- | -- | -.03 | -.07 | -.04 | | | -.05 | | | -- | | | | | .41 |
| ML | -- | -- | .40 | -- | -- | -- | -- | -.02 | -- | | | -- | | | -- | | | | | .38 |
| PM | -- | -- | -- | .55 | -- | -- | -.03 | -.08 | -.04 | | | -.06 | | | -- | | | | | .34 |
| PE | -- | -- | -- | -- | .61 | -- | -.03 | -.09 | -.04 | | | -.06 | | | -- | | | | | .39 |

+KEY+

| | | | | |
|---|---|---|---|---|
| BF | BeeF, veal | CG | other Coarse Grains |
| PK | PorK | RI | RIce |
| ML | Mutton, Lamb | SB | SoyBeans |
| PM | Poultry Meat | SM | SoyMeal |
| PE | Poultry Eggs | SO | SoyOil |
| DM | Dairy - Milk | OS | Other oilSeeds |
| DB | Dairy - Butter | OM | Other Meals |
| DC | Dairy - Cheese | OO | Other Oils |
| DP | Dairy - Powder | CT | CoTton |
| WH | WHeat | SU | SUgar |
| CN | CorN | TB | ToBacco |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WH | .43 | -- | -.13 | -.12 | -- | | | -- | -.01 | -- | | | -- | | | -- | -.01 | -- | .17 |
| CN | | .47 | -.09 | -.17 | -- | | | -- | | | -- | | | -- | -.07 | -- | .14 |
| CG | | -.03 | .42 | -.12 | -.08 | | | -- | | | -- | | | -- | -- | -- | .19 |
| RI | | -- | -- | .31 | -- | | | -- | | | -- | | | -- | -- | -- | .30 |
| SB | | -- | -.09 | -- | .30 | | | -.02 | | | -- | | | -- | -- | -- | .19 |
| SM | | | | | -.37 | .30 | .12 | | | | | | | | | | .05 |
| SO | | | | | -.37 | .30 | .12 | | | | | | | | | | .05 |
| OS | | -- | -.02 | -- | -.08 | | | .35 | | | -- | -- | -- | -- | -- | -- | .25 |
| OM | | | | | | | | -.59 | .15 | .49 | | | | | | | .05 |
| OO | | | | | | | | -.59 | .15 | .49 | | | | | | | .05 |
| CT | | -- | -- | -- | -- | | | -- | | | .22 | -- | -- | -- | -- | -- | .22 |
| SU | | -.03 | -- | -- | -- | | | -- | | | -- | .20 | -- | .16 | | | |
| TB | | -- | -- | -.05 | -- | | | -- | | | -- | -- | -- | .36 | .32 | | |

| Demand | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | -.72 | .20 | -- | .02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.50 |
| PK | .07 | -.62 | -- | .05 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.50 |
| ML | -- | -- | -.41 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.41 |
| PM | .03 | .18 | -- | -.66 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.45 |
| PE | -- | -- | -- | -- | -.32 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.32 |
| WH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.49 | .03 | .04 | .22 | -- | .02 | -- | -- | -- | -- | -- | -- | -- | -.18 |
| CN | -- | -- | -- | -- | -- | -- | -- | -- | -- | .04 | -.48 | .08 | -- | -- | .10 | -- | -- | -- | -- | -- | -- | -- | -.26 |
| CG | -- | -- | -- | -- | -- | -- | -- | -- | -- | .08 | .16 | -.84 | .07 | -- | .06 | -- | -- | -- | -- | -- | -- | -- | -.46 |
| RI | -- | -- | -- | -- | -- | -- | -- | -- | -- | .02 | -- | -- | -.21 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.19 |
| SB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.17 | .08 | .03 | -- | | | -- | -- | -- | -.06 |
| SM | -- | -- | -- | -- | -- | -- | -- | -- | -- | .04 | .14 | .05 | -- | | -.76 | -- | -- | -- | -- | -- | -- | -- | -.52 |
| SO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -.86 | -- | -- | .16 | -- | -- | -- | -.70 |
| OS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | -.29 | .05 | .15 | -- | -- | -- | -.10 |
| OM | -- | -- | -- | -- | -- | -- | -- | -- | -- | .02 | .02 | .02 | -- | -- | .08 | -- | | -1.01 | -- | -- | -- | -- | -.88 |
| OO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .09 | | -- | -.87 | -- | -- | -- | -.77 |
| CT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.43 | -- | -- | -.43 |
| SU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.72 | -- | -.72 |
| TB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.45 | -.45 |

Appendix table B11: Other Developing Country Importers (Rest of World)--Supply and demand elasticity matrices

| Supply | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | .38 | -.02 | -- | -- | -- | .03 | | | | -- | -- | -- | | | -- | | | -- | | | | | .36 |
| PK | -.05 | .55 | -- | -.02 | -- | -- | | | | -- | -- | -.02 | | | -.03 | | | -.01 | | | | | .40 |
| ML | -- | -- | .44 | -- | -- | -- | | | | -- | -.02 | -.04 | | | -- | | | -.01 | | | | | .35 |
| PM | -- | -.02 | -- | .61 | -- | -- | | | | -.04 | -.06 | -.09 | | | -.07 | | | -.03 | | | | | .30 |
| PE | -- | -- | -- | -- | .51 | -- | | | | -- | -.02 | -.03 | | | -.03 | | | -.03 | | | | | .39 |
| DM | .02 | -- | -- | -- | -- | .33 | | | | -- | -- | -- | | | -- | | | -.01 | | | | | .32 |
| DB | | | | | | -.03 | .08 | -.08 | .08 | | | | | | | | | | | | | | .05 |
| DC | | | | | | -.10 | -.07 | .30 | -.07 | | | | | | | | | | | | | | .05 |
| DP | | | | | | -.22 | .27 | -.27 | .27 | | | | | | | | | | | | | | .05 |
| WH | +KEY+ | | | | | | | | | .40 | -.01 | -.03 | -.03 | -- | | | -.03 | | | -.02 | -.01 | -- | .27 |
| CN | + | | | | | | | | | -.02 | .44 | -.04 | -.03 | -- | | | -.03 | | | -- | -- | -- | .31 |
| CG | BF | BeeF, veal | | | CG | other Coarse Grains | | | | -.04 | -.05 | .46 | -.02 | -- | | | -.06 | | | -.01 | -- | -- | .27 |
| RI | PK | PorK | | | RI | RIce | | | | -.01 | -- | -- | .36 | -- | | | -.02 | | | -.01 | -- | -- | .29 |
| SB | ML | Mutton, Lamb | | | SB | SoyBeans | | | | .04 | -.02 | -.07 | -.01 | .41 | | | -.09 | | | -- | -- | -- | .26 |
| SM | PM | Poultry Meat | | | SM | SoyMeal | | | | | | | | -.37 | .30 | .12 | | | | | | | .05 |
| SO | PE | Poultry Eggs | | | SO | SoyOil | | | | | | | | -.37 | .30 | .12 | | | | | | | .05 |
| OS | DM | Dairy - Milk | | | OS | Other oilSeeds | | | | -.05 | -.02 | -.04 | -.04 | -- | | | .30 | | | -.02 | -- | -- | .14 |
| OM | DB | Dairy - Butter | | | OM | Other Meals | | | | | | | | | | | -.41 | .11 | .35 | | | | .05 |
| OO | DC | Dairy - Cheese | | | OO | Other Oils | | | | -.04 | | | | | | | -.41 | .11 | .35 | | | | .05 |
| CT | DP | Dairy - Powder | | | CT | CoTton | | | | -.02 | -- | -.01 | -.06 | -- | | | -.04 | | | .49 | -- | -- | .34 |
| SU | WH | WHeat | | | SU | SUgar | | | | | -- | -- | -.02 | -- | | | -- | | | -- | .32 | -- | .26 |
| TB | CN | CorN | | | TB | ToBacco | | | | | -- | -- | -.03 | -- | | | -- | | | -- | -- | .22 | .19 |
| + | | | | | | | | | + | | | | | | | | | | | | | | |

| Demand | BF | PK | ML | PM | PE | DM | DB | DC | DP | WH | CN | CG | RI | SB | SM | SO | OS | OM | OO | CT | SU | TB | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | -.69 | .12 | -- | .05 | -- | .02 | -- | -- | -- | -.02 | -- | -- | -.02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.53 |
| PK | .35 | -.94 | -- | .08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.51 |
| ML | .02 | -- | -.50 | .08 | -- | .11 | .03 | -- | -- | -.03 | -.01 | -.03 | -.11 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.45 |
| PM | .13 | .07 | .07 | -.65 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.40 |
| PE | -- | -- | -- | -- | -.52 | .10 | .03 | -- | -- | -.03 | -.03 | -.01 | -.03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.47 |
| DM | .01 | -- | .02 | -- | .04 | -.11 | -- | -- | -- | -.07 | -- | -- | -.07 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.15 |
| DB | .03 | -- | .05 | -- | .09 | | -.60 | -- | -- | -.05 | -.04 | -.06 | -.06 | -- | -- | .02 | -- | -- | .12 | -- | -- | -- | -.47 |
| DC | .04 | -- | -- | -- | -- | | -- | -.38 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.34 |
| DP | .02 | -- | -- | -- | .02 | | -- | -- | -.33 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.32 |
| WH | -.02 | -- | -.01 | -- | -.02 | -.10 | -- | -- | -- | -.25 | .03 | .02 | .08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.29 |
| CN | -.02 | -- | -.01 | -- | -.05 | -- | -.02 | -- | -- | .09 | -.34 | .02 | .04 | -- | .01 | -- | -- | -- | -- | -- | -- | -- | -.30 |
| CG | -.02 | -- | -.03 | -- | -.02 | -- | -.03 | -- | -- | .06 | .02 | -.37 | .06 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.32 |
| RI | -- | -- | -.01 | -- | -- | -.04 | -- | -- | -- | .03 | -- | -- | -.42 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.45 |
| SB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.37 | .23 | .09 | -- | | | -- | -- | -- | -.06 |
| SM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .05 | .04 | -- | | -.56 | -- | -- | .13 | -- | -- | -- | -- | -.34 |
| SO | -- | -- | -- | -- | -- | -- | .04 | -- | -- | -.01 | -- | -- | -.04 | | -- | -.59 | -- | -- | .22 | -- | -- | -- | -.40 |
| OS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | -.34 | .07 | .22 | -- | -- | -- | -.06 |
| OM | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | .03 | .02 | -- | -- | .10 | -- | | -.34 | -- | -- | -- | -- | -.19 |
| OO | -- | -- | -- | -- | -- | -- | .03 | -- | -- | -- | -- | -- | -- | -- | -- | .03 | | -- | -.41 | -- | -- | -- | -.36 |
| CT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.48 | -- | -- | -.49 |
| SU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.36 | -- | -.36 |
| TB | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -.47 | -.47 |

## Appendix table B12: Estimated feed shares for animal product production in ST86

### United States

| Feed | BF | PK | ML | PM | PE | DM |
|---|---|---|---|---|---|---|
| WH | .05 | .03 | | .07 | .04 | .03 |
| CN | .21 | .25 | .01 | .10 | .08 | .15 |
| CG | .24 | .27 | .01 | .11 | .08 | .16 |
| SM | .11 | .31 | | .36 | .12 | .10 |
| OM | .11 | .31 | | .36 | .12 | .10 |

### Canada

| Feed | BF | PK | ML | PM | PE | DM |
|---|---|---|---|---|---|---|
| WH | | .13 | | .18 | .18 | |
| CN | .24 | .30 | | .09 | .06 | .14 |
| CG | .25 | .31 | | .09 | .06 | .15 |
| SM | .10 | .53 | | | .12 | .25 |
| OM | .10 | .53 | | | .12 | .25 |

### European Community (12)

| Feed | BF | PK | ML | PM | PE | DM |
|---|---|---|---|---|---|---|
| WH | .04 | .16 | .00 | .03 | .06 | .08 |
| CN | .08 | .26 | .02 | .10 | .12 | .16 |
| CG | .09 | .26 | .03 | .10 | .13 | .18 |
| SM | .06 | .31 | .02 | .17 | .19 | .25 |
| OM | .06 | .31 | .01 | .14 | .20 | .27 |

### Other Western Europe

| Feed | BF | PK | ML | PM | PE | DM |
|---|---|---|---|---|---|---|
| WH | .03 | .13 | | .05 | .03 | .04 |
| CN | .14 | .39 | .01 | .02 | .08 | .29 |
| CG | .13 | .36 | .01 | .02 | .07 | .27 |
| SM | .15 | .38 | .01 | .09 | .06 | .31 |
| OM | .15 | .38 | .01 | .09 | .06 | .31 |

### Japan

| Feed | BF | PK | ML | PM | PE | DM |
|---|---|---|---|---|---|---|
| WH | | .01 | | | | |
| CN | .10 | .22 | | .14 | .26 | .05 |
| CG | .12 | .27 | | .18 | .32 | .06 |
| SM | .06 | .31 | | .17 | .31 | .11 |
| OM | .06 | .31 | | .17 | .31 | .14 |

### Australia

| Feed | BF | PK | ML | PM | PE | DM |
|---|---|---|---|---|---|---|
| WH | .01 | .08 | .01 | .09 | .08 | .03 |
| CN | .10 | .21 | .07 | .07 | .14 | .06 |
| CG | .12 | .24 | .08 | .08 | .16 | .07 |
| SM | .08 | .45 | .05 | .03 | .21 | .18 |
| OM | .08 | .45 | .05 | .03 | .21 | .18 |

### New Zealand

| Feed | BF | PK | ML | PM | PE | DM |
|---|---|---|---|---|---|---|
| WH | .01 | .04 | .02 | .03 | | .08 |
| CN | .12 | .11 | .32 | .04 | | .25 |
| CG | .08 | .08 | .21 | .03 | | .17 |
| SM | .06 | .17 | .16 | .09 | | .51 |
| OM | .06 | .17 | .16 | .09 | | .51 |

### Developing Country Exporters

| Feed | BF | PK | ML | PM | PE | DM |
|---|---|---|---|---|---|---|
| WH | .00 | | | | | |
| CN | .16 | .08 | .00 | .14 | .07 | .16 |
| CG | .19 | .08 | .02 | .11 | .10 | .25 |
| SM | .10 | .17 | .00 | .37 | .12 | .10 |
| OM | .09 | .15 | .00 | .31 | .10 | .08 |

### Centrally Planned Countries

| Feed | BF | PK | ML | PM | PE | DM |
|---|---|---|---|---|---|---|
| WH | .03 | .08 | .00 | .01 | .04 | .06 |
| CN | .07 | .42 | .02 | .08 | .06 | .08 |
| CG | .11 | .19 | .02 | .08 | .09 | .11 |
| SM | .07 | .13 | .01 | .16 | .17 | .45 |
| OM | .05 | .44 | .01 | .13 | .09 | .26 |

### Developing Asian Country Importers

| Feed | BF | PK | ML | PM | PE | DM |
|---|---|---|---|---|---|---|
| WH | .02 | .17 | | .07 | .07 | |
| CN | .03 | .38 | .00 | .18 | .25 | |
| CG | .01 | .40 | | .18 | .20 | |
| SM | .01 | .42 | | .20 | .25 | |
| OM | .02 | .38 | | .15 | .34 | |

### Other Developing Country Importers

| Feed | BF | PK | ML | PM | PE | DM |
|---|---|---|---|---|---|---|
| WH | .00 | .00 | .00 | .01 | .00 | .00 |
| CN | .04 | .00 | .02 | .06 | .05 | .06 |
| CG | .03 | .02 | .03 | .08 | .07 | .05 |
| SM | .07 | .11 | .02 | .32 | .29 | .11 |
| OM | .03 | .04 | .04 | .09 | .22 | .24 |

+KEY+

| Feed |
|---|
| WH WHeat |
| CN CorN |
| CG other Coarse Grains |
| SM SoyMeal |
| OM Other Meals |

| Animal Product |
|---|
| BF BeeF, veal |
| PK PorK |
| ML Mutton, Lamb |
| PM Poultry Meat |
| PE Poultry Eggs |
| DM Dairy - Milk |

Estimated Share of Milk Going to Use Other Than the Manufacture of Butter, Cheese, and Milk Powder

| Country/Region in ST86 | Share |
|---|---|
| United States | .42 |
| Canada | .35 |
| European Community | .24 |
| Other Western Europe | .31 |
| Japan | .59 |
| Australia | .27 |
| New Zealand | .06 |
| Developing Country Exporters | .50 |
| Centrally Planned Countries | .27 |
| Developing Asian Importers | |
| Other Developing Importers | .50 |

## Appendix C--ST86 Base Quantity, Price, and Support Data

The SWOPSIM framework allows for the use of spreadsheets (worksheets) containing support information about producer and consumer subsidy equivalents. The worksheets include base quantity and price data which are used, along with the support information, to calculate price wedges used in SWOPSIM models to move along supply and demand schedules in response to policy changes. This appendix presents, in summary tables for each ST86 country or region, information available in the full support worksheets for ST86. Additional details on all 36 countries/regions can be found in (Sullivan, Wainio, and Roningen, 1989).

The top half of the summary table gives the base data used in ST86. The left half shows the quantities of supply, demand, exports, imports, and net trade (equal to exports minus imports as well supply minus demand). The right half gives the base price data which includes the world (trade reference) price, the market price seen by the producer (includes market support but not direct payments to producers), the producer and consumer incentive prices (includes direct payments and/or taxes or fees collected), and the derived trade price at the producer level (the market price minus market support). The final top column gives the base value of production valued at producer market prices. This variable is an example of an indicator of sector size that is frequently used in the ST86 model and database. The prices are derived from some initial observed price, using support data and relationships explained in Appendix D.

The bottom half of the table summarizes the agricultural support information used in ST86. This includes the producer subsidy equivalent (PSE) and the consumer subsidy equivalent (CSE) as a percentage of the producer and consumer incentive prices. (Recall that in SWOPSIM notation, subsidies are positive numbers while taxes are negative). These support measures are most comparable to ones appearing in other studies. Next the producer, consumer, and market support rates are given on a per unit basis. In addition, price wedges broken down as they appear in the model are given: the distortive producer subsidy wedge (DPSW), consumer subsidy wedge (CSW), export subsidy wedge (ESW), and import subsidy wedge (MSW). These measures will appear both in the support worksheet and in the model and solution data set. The commodity code definition and mnemonic scheme appear in the final column in the bottom half of the summary table.

The full support worksheets (summarized in these tables) contain budget and consumer-producer transfer information in local currency, which form the basis for PSE, CSE, and price wedge calculations. The worksheets also contain several indicators derived from the support and base data that provide additional information on support patterns and serve as a check on the support data. The worksheet calculates the government budget exposure from the basic support data. SWOPSIM computer programs move the relevant price wedge, budget, and price data from the support worksheet to model worksheets. Each full country or region support worksheet is about 9-11 pages long and allows for documentation of the source of support information.

Appendix table C1: United States--ST86 base quantity, price, and support data

| | 1986 Quantity Data (1000 Metric Tons) | | | | | 1986 Price Data (U.S. $/Metric Ton) | | | | | Prod. V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Supply | Demand | Exports | Imports | Net Trade | World | Market | Producer | Consumer | Trade | (Mil. $) |
| BF | 11292 | 12031 | 239 | 978 | -739 | 2091 | 1878 | 2049 | 3414 | 1833 | 21202 |
| PK | 6379 | 6849 | 39 | 509 | -470 | 2341 | 1494 | 1612 | 2988 | 1494 | 9532 |
| ML | 153 | 171 | 1 | 19 | -18 | 2030 | 2902 | 3336 | 5804 | 2889 | 444 |
| PM | 8263 | 7987 | 276 | | 276 | 1083 | 1049 | 1131 | 1907 | 952 | 8667 |
| PE | 4058 | 3994 | 74 | 10 | 64 | 2145 | 1092 | 1160 | 1668 | 1073 | 4431 |
| DM | 65354 | 65354 | | | | 275 | 278 | 287 | 555 | 222 | 18147 |
| DB | 545 | 522 | 25 | 2 | 23 | 2048 | 2549 | 2549 | 3187 | 1024 | 1389 |
| DC | 2363 | 2470 | 27 | 134 | -107 | 2744 | 2358 | 2358 | 3188 | 1372 | 5573 |
| DP | 582 | 282 | 409 | 109 | 300 | 1984 | 1659 | 1659 | 2014 | 992 | 965 |
| WH | 56925 | 30173 | 27324 | 572 | 26752 | 115 | 86 | 168 | 122 | 68 | 4872 |
| CN | 209632 | 170547 | 39136 | 51 | 39085 | 87 | 59 | 101 | 66 | 53 | 12388 |
| CG | 43316 | 35860 | 8110 | 654 | 7456 | 82 | 71 | 102 | 78 | 53 | 3058 |
| RI | 4280 | 1644 | 2719 | 83 | 2636 | 210 | 122 | 348 | 244 | 113 | 522 |
| SB | 52801 | 32117 | 20684 | | 20684 | 208 | 171 | 189 | 180 | 171 | 9015 |
| SM | 25163 | 18541 | 6622 | | 6622 | 184 | 184 | 184 | 230 | 184 | 4630 |
| SO | 5803 | 5304 | 499 | | 499 | 342 | 342 | 342 | 684 | 342 | 1985 |
| OS | 6634 | 6023 | 677 | 66 | 611 | 324 | 240 | 298 | 266 | 240 | 1589 |
| OM | 1611 | 1653 | 120 | 162 | -42 | 166 | 166 | 166 | 208 | 166 | 267 |
| OO | 697 | 1456 | 277 | 1036 | -759 | 569 | 569 | 569 | 1138 | 569 | 397 |
| CT | 2119 | 664 | 1456 | 1 | 1455 | 1056 | 1152 | 2040 | 2304 | 1150 | 2441 |
| SU | 5461 | 7158 | 460 | 2157 | -1697 | 133 | 418 | 324 | 885 | 67 | 2284 |
| TB | 475 | 465 | 217 | 207 | 10 | 3606 | 3606 | 3946 | 7212 | 3606 | 1713 |

| | Subsidy Equivalent Percent | | 1986 Support Rates (U.S. $/Metric Ton) | | | | | | | Product Definition and Code Mnemonics |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Summary Support Rates | | | Model Price Wedges | | | | |
| | Producer | Consumer | Producer | Consumer | Market | Producer | Consumer | Export | Import | |
| BF | 10 | -1 | 215 | -44 | 44 | 171 | | | -44 | BF BeeF, veal |
| PK | 7 | | 117 | | | 117 | | | | PK PorK |
| ML | 13 | | 447 | -12 | 12 | 435 | | | -12 | ML Mutton, Lamb |
| PM | 16 | -5 | 17′ | -97 | 97 | 82 | | 97 | | PM Poultry Meat |
| PE | 8 | -1 | 87 | -19 | 19 | 68 | | 19 | | PE Poultry Eggs |
| DM | 23 | -10 | 65 | -55 | 55 | 65 | -55 | | | DM Dairy - Milk |
| DB | 60 | -48 | 1525 | -1525 | 1525 | | | 1525 | | DB Dairy - Butter |
| DC | 42 | -30 | 986 | -966 | 986 | 986 | -966 | | | DC Dairy - Cheese |
| DP | 40 | -33 | 667 | -667 | 667 | | | 667 | | DP Dairy - Powder |
| WH | 59 | -14 | 100 | -17 | 17 | 82 | | 17 | | WH WHeat |
| CN | 47 | -9 | 48 | -6 | 6 | 42 | | 6 | | CN CorN |
| CG | 48 | -22 | 49 | -17 | 17 | 32 | | 17 | | CG o. Coarse Gr. |
| RI | 67 | -4 | 234 | -9 | 9 | 226 | | 9 | | RI RIce |
| SB | 10 | | 18 | | | 18 | | | | SB SoyBeans |
| SM | | | | | | | | | | SM SoyMeal |
| SO | | | | | | | | | | SO SoyOil |
| OS | 20 | | 58 | | | 58 | | | | OS Other oilSeeds |
| OM | | | | | | | | | | OM Other Meals |
| OO | | | | | | | | | | OO Other Oils |
| CT | 44 | | 890 | -2 | 2 | 889 | | 2 | | CT CoTton |
| SU | 79 | -47 | 257 | -415 | 352 | 257 | -415 | | | SU SUgar |
| TB | 9 | | 340 | | | 340 | | | | TB ToBacco |

Appendix table C2: Canada--ST86 base quantity, price, and support data

| | 1986 Quantity Data (1000 Metric Tons) | | | | | 1986 Price Data (U.S. $/Metric Ton) | | | | | Prod. V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Supply | Demand | Exports | Imports | Net Trade | World | Market | Producer | Consumer | Trade | (Mil. $) |
| BF | 1040 | 1047 | 105 | 112 | -7 | 2091 | 2015 | 2205 | 3664 | 1983 | 2096 |
| PK | 908 | 707 | 215 | 14 | 201 | 2341 | 1290 | 1440 | 2579 | 1290 | 1171 |
| ML | 8 | 21 | | | -13 | 2030 | 2030 | 2236 | 4060 | 2030 | 16 |
| PM | 628 | 663 | 3 | 38 | -35 | 1083 | 1085 | 1190 | 1972 | 1149 | 681 |
| PE | 349 | 356 | 11 | 18 | -7 | 2145 | 2004 | 2199 | 3341 | 2145 | 700 |
| DM | 7925 | 7925 | | | | 275 | 356 | 383 | 904 | 250 | 2820 |
| DB | 109 | 109 | | | | 2048 | 5369 | 5369 | 7104 | 1867 | 585 |
| DC | 226 | 235 | 12 | 21 | -9 | 2744 | 4011 | 4011 | 5782 | 2027 | 906 |
| DP | 109 | 43 | 66 | | 66 | 1984 | 3405 | 3405 | 4256 | 1609 | 371 |
| WH | 31377 | 10567 | 20810 | | 20810 | 115 | 90 | 149 | 150 | 90 | 2811 |
| CN | 5912 | 6402 | 150 | 640 | -490 | 87 | 63 | 77 | 70 | 60 | 370 |
| CG | 19760 | 12817 | 6943 | | 6943 | 82 | 46 | 84 | 51 | 46 | 902 |
| RI | 1 | 121 | | 120 | -120 | 210 | 210 | 210 | 420 | 210 | |
| SB | 958 | 980 | 178 | 200 | -22 | 208 | 163 | 214 | 172 | 163 | 157 |
| SM | 731 | 1344 | 7 | 620 | -613 | 184 | 184 | 184 | 230 | 184 | 135 |
| SO | 160 | 165 | 5 | 10 | -5 | 342 | 342 | 342 | 684 | 342 | 55 |
| OS | 4870 | 2193 | 2814 | 137 | 2677 | 324 | 648 | 757 | 722 | 648 | 3156 |
| OM | 926 | 505 | 442 | 21 | 421 | 166 | 166 | 166 | 208 | 166 | 154 |
| OO | 648 | 425 | 290 | 67 | 223 | 569 | 569 | 569 | 1138 | 569 | 369 |
| CT | 1 | 53 | | 52 | -52 | 1056 | 1056 | 1056 | 2112 | 1056 | 1 |
| SU | 60 | 1138 | 67 | 1145 | -1078 | 133 | 122 | 213 | 244 | 100 | 7 |
| TB | 63 | 36 | 29 | 2 | 27 | 3606 | 2973 | 2973 | 5945 | 3606 | 187 |

| | Subsidy Equivalent Percent | | 1986 Support Rates (U.S. $/Metric Ton) | | | | | | | Product Definition and Code Mnemonics |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Summary Support Rates | | | Model Price Wedges | | | | |
| | Producer | Consumer | Producer | Consumer | Market | Producer | Consumer | Export | Import | |
| BF | 10 | | 222 | -32 | 32 | 190 | | | -32 | BF BeeF, veal |
| PK | 10 | | 151 | | | 151 | | | | PK PorK |
| ML | 9 | | 206 | | | 206 | | | | ML Mutton, Lamb |
| PM | 3 | 3 | 40 | 65 | -65 | 105 | | | 65 | PM Poultry Meat |
| PE | 2 | 4 | 54 | 141 | -141 | 195 | | | 141 | PE Poultry Eggs |
| DM | 35 | -33 | 133 | -299 | 106 | 133 | -299 | | | DM Dairy - Milk |
| DB | 65 | -55 | 3502 | -3895 | 3502 | 3502 | -3895 | | | DB Dairy - Butter |
| DC | 49 | -35 | 1984 | -2036 | 1984 | 1984 | -2036 | | | DC Dairy - Cheese |
| DP | 53 | -42 | 1796 | -1796 | 1796 | | | 1796 | | DP Dairy - Powder |
| WH | 40 | -15 | 59 | -22 | | 59 | -22 | | | WH WHeat |
| CN | 22 | -3 | 17 | -2 | 2 | 14 | | | -2 | CN CorN |
| CG | 45 | | 38 | | | 38 | | | | CG o. Coarse Gr. |
| RI | | | | | | | | | | RI RIce |
| SB | 24 | | 51 | | | 51 | | | | SB SoyBeans |
| SM | | | | | | | | | | SM SoyMeal |
| SO | | | | | | | | | | SO SoyOil |
| OS | 14 | | 109 | | | 109 | | | | OS Other oilSeeds |
| OM | | | | | | | | | | OM Other Meals |
| OO | | | | | | | | | | OO Other Oils |
| CT | | | | | | | | | | CT CoTton |
| SU | 53 | -9 | 113 | -22 | 22 | 91 | | | -22 | SU SUgar |
| TB | -21 | 11 | -633 | 633 | -633 | | | -633 | | TB ToBacco |

Appendix table C3: European Community (12)--ST86 base quantity, price, and support data

| | 1986 Quantity Data (1000 Metric Tons) | | | | | 1986 Price Data (U.S. $/Metric Ton) | | | | | Prod. V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Supply | Demand | Exports | Imports | Net Trade | World | Market | Producer | Consumer | Trade | (Mil. $) |
| BF | 7445 | 6691 | 1177 | 423 | 754 | 2091 | 3024 | 3081 | 5499 | 1955 | 22515 |
| PK | 10158 | 9909 | 351 | 102 | 249 | 2341 | 1561 | 1564 | 3013 | 1171 | 15855 |
| ML | 717 | 910 | 3 | 196 | -193 | 2030 | 4106 | 5001 | 8212 | 2042 | 2944 |
| PM | 4492 | 4164 | 410 | 82 | 328 | 1083 | 1430 | 1435 | 2600 | 954 | 6425 |
| PE | 4117 | 4031 | 128 | 42 | 86 | 2145 | 2341 | 2341 | 3902 | 2145 | 9638 |
| DM | 112047 | 112047 | 26 | 26 | | 275 | 263 | 261 | 524 | 225 | 29420 |
| DB | 2142 | 1941 | 270 | 69 | 201 | 2048 | 3469 | 3469 | 4210 | 1333 | 7431 |
| DC | 3905 | 3658 | 330 | 83 | 247 | 2744 | 3829 | 3829 | 5470 | 2925 | 14951 |
| DP | 2262 | 1956 | 326 | 20 | 306 | 1984 | 1994 | 1994 | 2436 | 992 | 4511 |
| WH | 66933 | 51236 | 18561 | 2864 | 15697 | 115 | 182 | 184 | 259 | 76 | 12149 |
| CN | 21002 | 21756 | 1365 | 2119 | -754 | 87 | 183 | 183 | 204 | 70 | 3852 |
| CG | 47888 | 40999 | 7119 | 230 | 6889 | 82 | 161 | 160 | 178 | 98 | 7688 |
| RI | 831 | 1028 | 507 | 704 | -197 | 210 | 350 | 351 | 685 | 105 | 291 |
| SB | 899 | 10760 | 8 | 9869 | -9861 | 208 | 208 | 424 | 219 | 208 | 187 |
| SM | 7983 | 15615 | 1096 | 8728 | -7632 | 184 | 184 | 184 | 230 | 184 | 1469 |
| SO | 1754 | 1190 | 565 | 1 | 564 | 342 | 342 | 342 | 684 | 342 | 600 |
| OS | 6365 | 7791 | 49 | 1475 | -1426 | 324 | 162 | 473 | 179 | 162 | 1031 |
| OM | 4025 | 8808 | 113 | 4896 | -4783 | 166 | 166 | 166 | 208 | 166 | 668 |
| OO | 3163 | 4467 | 617 | 1921 | -1304 | 569 | 569 | 653 | 1090 | 569 | 1800 |
| CT | 207 | 1044 | 17 | 854 | -837 | 1056 | 1056 | 3585 | 2112 | 1056 | 219 |
| SU | 13423 | 10438 | 4449 | 1464 | 2985 | 133 | 442 | 364 | 884 | 191 | 5931 |
| TB | 308 | 555 | 118 | 365 | -247 | 3606 | 3606 | 5950 | 7212 | 3606 | 1111 |

| | Subsidy Equivalent Percent | | 1986 Support Rates (U.S. $/Metric Ton) | | | | | | | Product Definition and Code Mnemonics | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Summary Support Rates | | | Model Price Wedges | | | | | |
| | Producer | Consumer | Producer | Consumer | Market | Producer | Consumer | Export | Import | | |
| BF | 37 | -19 | 1126 | -1069 | 1069 | 57 | | 1069 | | BF | BeeF, veal |
| PK | 25 | -13 | 394 | -390 | 390 | 3 | | 390 | | PK | PorK |
| ML | 59 | -25 | 2959 | -2064 | 2064 | 895 | | | -2064 | ML | Mutton, Lamb |
| PM | 33 | -18 | 481 | -476 | 476 | 4 | | 476 | | PM | Poultry Meat |
| PE | 8 | -5 | 196 | -196 | 196 | | | 196 | | PE | Poultry Eggs |
| DM | 14 | -7 | 35 | -36 | 37 | 35 | -36 | | | DM | Dairy - Milk |
| DB | 62 | -48 | 2136 | -2010 | 2136 | | 126 | 2136 | | DB | Dairy - Butter |
| DC | 24 | -17 | 904 | -904 | 904 | | | 904 | | DC | Dairy - Cheese |
| DP | 50 | -41 | 1002 | -1002 | 1002 | | | 1002 | | DP | Dairy - Powder |
| WH | 59 | -41 | 109 | -106 | 106 | 3 | | 106 | | WH | WHeat |
| CN | 62 | -56 | 114 | -114 | 114 | | | | -114 | CN | CorN |
| CG | 39 | -35 | 62 | -63 | 63 | | | 63 | | CG | o. Coarse Gr. |
| RI | 70 | -36 | 246 | -245 | 245 | | | | -245 | RI | RIce |
| SB | 51 | | 216 | | | 216 | | | | SB | SoyBeans |
| SM | | | | | | | | | | SM | SoyMeal |
| SO | | | | | | | | | | SO | SoyOil |
| OS | 66 | | 311 | | | 311 | | | | OS | Other oilSeeds |
| OM | | | | | | | | | | OM | Other Meals |
| OO | 13 | 4 | 84 | 48 | | 84 | 48 | | | OO | Other Oils |
| CT | 71 | | 2529 | | | 2529 | | | | CT | CoTton |
| SU | 47 | -28 | 173 | -250 | 250 | -78 | | 250 | | SU | SUgar |
| TB | 39 | | 2344 | | | 2344 | | | | TB | ToBacco |

Appendix table C4: Other Western Europe--ST86 base quantity, price, and support data

| | 1986 Quantity Data (1000 Metric Tons) | | | | | 1986 Price Data (U.S. $/Metric Ton) | | | | | Prod. V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Supply | Demand | Exports | Imports | Net Trade | World | Market | Producer | Consumer | Trade | (Mil. $) |
| BF | 673 | 581 | 112 | 20 | 92 | 2091 | 2091 | 4224 | 5169 | 2091 | 1407 |
| PK | 1157 | 1105 | 64 | 12 | 52 | 2341 | 2341 | 3468 | 6039 | 2341 | 2709 |
| ML | 11 | 11 | | | | 2030 | 2030 | 3728 | 5228 | 2030 | 22 |
| PM | 168 | 218 | | 50 | -50 | 1083 | 1083 | 2192 | 2834 | 1083 | 182 |
| PE | 237 | 269 | 25 | 57 | -32 | 2145 | 2145 | 2145 | 3575 | 2145 | 508 |
| DM | 16196 | 16196 | 30 | 33 | | 275 | 275 | 435 | 591 | 275 | 4454 |
| DB | 244 | 218 | 34 | 8 | 26 | 2048 | 2048 | 7351 | 4572 | 2048 | 500 |
| DC | 464 | 358 | 157 | 51 | 106 | 2744 | 2744 | 8651 | 5294 | 2744 | 1273 |
| DP | 164 | 122 | 43 | 1 | 42 | 1984 | 1984 | 6624 | 3841 | 1984 | 325 |
| WH | 4333 | 3507 | 1441 | 615 | 826 | 115 | 115 | 242 | 299 | 115 | 498 |
| CN | 1913 | 1998 | 154 | 239 | -85 | 87 | 87 | 205 | 210 | 87 | 166 |
| CG | 10350 | 9985 | 1119 | 754 | 365 | 82 | 82 | 154 | 159 | 82 | 849 |
| RI | 1 | 233 | | 232 | -232 | 210 | 210 | 210 | 420 | 210 | |
| SB | 1 | 508 | | 507 | -507 | 208 | 208 | 208 | 219 | 208 | |
| SM | 397 | 847 | 150 | 600 | -450 | 184 | 184 | 184 | 230 | 184 | 73 |
| SO | 88 | 164 | 15 | 91 | -76 | 342 | 342 | 342 | 684 | 342 | 30 |
| OS | 601 | 582 | 160 | 141 | 19 | 324 | 324 | 324 | 360 | 324 | 195 |
| OM | 283 | 441 | 1 | 159 | -158 | 166 | 166 | 166 | 208 | 166 | 47 |
| OO | 197 | 367 | 73 | 243 | -170 | 569 | 569 | 569 | 1138 | 569 | 112 |
| CT | 1 | 106 | 2 | 107 | -105 | 1056 | 1056 | 1056 | 2112 | 1056 | 1 |
| SU | 1039 | 1424 | 92 | 477 | -385 | 133 | 133 | 392 | 423 | 133 | 138 |
| TB | 2 | 49 | 6 | 53 | -47 | 3606 | 3606 | 3606 | 7212 | 3606 | 7 |

| | Subsidy Equivalent Percent | | 1986 Support Rates (U.S. $/Metric Ton) | | | | | | | Product Definition and Code Mnemonics |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Summary Support Rates | | | Model Price Wedges | | | | |
| | Producer | Consumer | Producer | Consumer | Market | Producer | Consumer | Export | Import | |
| BF | 50 | -26 | 2133 | -1367 | | 2133 | -1367 | | | BF BeeF, veal |
| PK | 32 | -22 | 1127 | -1357 | | 1127 | -1357 | | | PK PorK |
| ML | 46 | -22 | 1698 | -1168 | | 1698 | -1168 | | | ML Mutton, Lamb |
| PM | 51 | -31 | 1109 | -865 | | 1109 | -865 | | | PM Poultry Meat |
| PE | | | | | | | | | | PE Poultry Eggs |
| DM | 37 | -7 | 160 | -41 | | 160 | -41 | | | DM Dairy - Milk |
| DB | 72 | -44 | 5303 | -2012 | | 5303 | -2012 | | | DB Dairy - Butter |
| DC | 68 | -26 | 5907 | -1374 | | 5907 | -1374 | | | DC Dairy - Cheese |
| DP | 70 | -35 | 4640 | -1361 | | 4640 | -1361 | | | DP Dairy - Powder |
| WH | 52 | -45 | 127 | -135 | | 127 | -135 | | | WH WHeat |
| CN | 58 | -54 | 118 | -113 | | 118 | -113 | | | CN CorN |
| CG | 47 | -43 | 72 | -68 | | 72 | -68 | | | CG o. Coarse Gr. |
| RI | | | | | | | | | | RI RIce |
| SB | | | | | | | | | | SB SoyBeans |
| SM | | | | | | | | | | SM SoyMeal |
| SO | | | | | | | | | | SO SoyOil |
| OS | | | | | | | | | | OS Other oilSeeds |
| OM | | | | | | | | | | OM Other Meals |
| OO | | | | | | | | | | OO Other Oils |
| CT | | | | | | | | | | CT CoTton |
| SU | 66 | -37 | 259 | -157 | | 259 | -157 | | | SU SUgar |
| TB | | | | | | | | | | TB ToBacco |

Appendix table C5: Japan--ST86 base quantity, price, and support data

| | -----1986 Quantity Data (1000 Metric Tons)---- | | | | | -----1986 Price Data (U.S. $/Metric Ton)----- | | | | | Prod. V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Supply | Demand | Exports | Imports | Net Trade | World | Market | Producer | Consumer | Trade | (Mil. $) |
| BF | 559 | 815 | | 256 | -256 | 2091 | 9237 | 10140 | 16703 | 3460 | 5164 |
| PK | 1552 | 1849 | | 297 | -297 | 2341 | 3020 | 3365 | 6041 | 1764 | 4688 |
| ML | 1 | 160 | | 159 | -159 | 2030 | 3287 | 3287 | 6573 | 2030 | 3 |
| PM | 1421 | 1601 | | 180 | -180 | 1083 | 1472 | 1601 | 2676 | 1245 | 2091 |
| PE | 2194 | 2372 | 1 | 179 | -178 | 2145 | 2510 | 2723 | 4183 | 2145 | 5506 |
| DM | 7457 | 7457 | | | | 275 | 529 | 629 | 1247 | 226 | 3943 |
| DB | 88 | 90 | | 2 | -2 | 2048 | 7542 | 7542 | 9428 | 1418 | 664 |
| DC | 24 | 105 | | 81 | -81 | 2744 | 3175 | 3175 | 4535 | 2744 | 76 |
| DP | 184 | 275 | | 91 | -91 | 1984 | 3383 | 4254 | 4210 | 992 | 623 |
| WH | 876 | 6266 | 391 | 5781 | -5390 | 115 | 137 | 1443 | 376 | 137 | 120 |
| CN | 2 | 15502 | | 15500 | -15500 | 87 | 118 | 118 | 131 | 111 | |
| CG | 351 | 6261 | | 5910 | -5910 | 82 | 131 | 1260 | 145 | 78 | 46 |
| RI | 10599 | 10619 | | 20 | -20 | 210 | 305 | 2274 | 2189 | 305 | 3234 |
| SB | 245 | 5165 | | 4920 | -4920 | 208 | 416 | 1966 | 475 | 416 | 102 |
| SM | 2990 | 3170 | | 180 | -180 | 184 | 184 | 184 | 230 | 184 | 550 |
| SO | 693 | 691 | 2 | | 2 | 342 | 342 | 342 | 684 | 342 | 237 |
| OS | 49 | 2151 | | 2102 | -2102 | 324 | 324 | 324 | 360 | 324 | 16 |
| OM | 1047 | 1277 | | 230 | -230 | 166 | 166 | 166 | 208 | 166 | 174 |
| OO | 733 | 1033 | | 300 | -300 | 569 | 569 | 569 | 1138 | 569 | 417 |
| CT | 1 | 804 | | 803 | -803 | 1056 | 1056 | 1056 | 2112 | 1056 | 1 |
| SU | 943 | 2796 | 4 | 1857 | -1853 | 133 | 921 | 1026 | 2633 | 266 | 868 |
| TB | 106 | 160 | 12 | 66 | -54 | 3606 | 3606 | 3606 | 7212 | 3606 | 382 |

| | Subsidy Equivalent | | ----------1986 Support Rates (U.S. $/Metric Ton)---------- | | | | | | | +----------+ |
|---|---|---|---|---|---|---|---|---|---|---|
| | Percent | | ----Summary Support Rates--- | | | ----------Model Price Wedges---------- | | | | Product Definition |
| | Producer | Consumer | Producer | Consumer | Market | Producer | Consumer | Export | Import | and Code Mnemonics |
| BF | 66 | -34 | 6680 | -5685 | 5778 | 6033 | -5038 | | -647 | BF BeeF, veal |
| PK | 48 | -21 | 1601 | -1257 | 1257 | 345 | | | -1257 | PK PorK |
| ML | 38 | -19 | 1257 | -1257 | 1257 | | | | -1257 | ML Mutton, Lamb |
| PM | 22 | -8 | 355 | -226 | 226 | 129 | | | -226 | PM Poultry Meat |
| PE | 21 | -9 | 578 | -365 | 365 | 213 | | | -365 | PE Poultry Eggs |
| DM | 64 | -39 | 403 | -492 | 303 | 403 | -492 | | | DM Dairy - Milk |
| DB | 81 | -65 | 6124 | -6124 | 6124 | 6124 | -6124 | | | DB Dairy - Butter |
| DC | 14 | -9 | 431 | -431 | 431 | | | | -431 | DC Dairy - Cheese |
| DP | 77 | -57 | 3262 | -2391 | 2391 | 3262 | -2391 | | | DP Dairy - Powder |
| WH | 91 | -48 | 1307 | -181 | | 1307 | -181 | | | WH WHeat |
| CN | 6 | -5 | 7 | -7 | 7 | | | | -7 | CN CorN |
| CG | 94 | -36 | 1182 | -53 | 53 | 1130 | | | -53 | CG o. Coarse Gr. |
| RI | 87 | -72 | 1969 | -1579 | | 1969 | -1579 | | | RI RIce |
| SB | 79 | | 1550 | | | 1550 | | | | SB SoyBeans |
| SM | | | | | | | | | | SM SoyMeal |
| SO | | | | | | | | | | SO SoyOil |
| OS | | | | | | | | | | OS Other oilSeeds |
| OM | | | | | | | | | | OM Other Meals |
| OO | | | | | | | | | | OO Other Oils |
| CT | | | | | | | | | | CT CoTton |
| SU | 74 | -29 | 760 | -756 | 655 | 501 | -498 | | -258 | SU SUgar |
| TB | | | | | | | | | | TB ToBacco |

Appendix table C6: Australia--ST86 base quantity, price, and support data

| | -----1986 Quantity Data (1000 Metric Tons)---- | | | | | -----1986 Price Data (U.S. $/Metric Ton)----- | | | | | Prod. V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Supply | Demand | Exports | Imports | Net Trade | World | Market | Producer | Consumer | Trade | (Mil. $) |
| BF | 1478 | 669 | 809 | | 809 | 2091 | 1167 | 1226 | 2123 | 1167 | 1725 |
| PK | 270 | 267 | 3 | | 3 | 2341 | 2341 | 2341 | 4682 | 2341 | 632 |
| ML | 584 | 363 | 221 | | 221 | 2030 | 1015 | 1041 | 2030 | 1015 | 593 |
| PM | 367 | 365 | 2 | | 2 | 1083 | 1083 | 1083 | 1969 | 1083 | 397 |
| PE | 190 | 185 | 5 | | 5 | 2145 | 2145 | 2145 | 3575 | 2145 | 408 |
| DM | 6205 | 6205 | | | | 275 | 138 | 241 | 269 | 138 | 853 |
| DB | 105 | 56 | 49 | | 49 | 2048 | 2048 | 2400 | 2560 | 2048 | 215 |
| DC | 170 | 124 | 66 | 20 | 46 | 2744 | 2744 | 3014 | 3920 | 2744 | 466 |
| DP | 131 | 43 | 88 | | 88 | 1984 | 1984 | 2066 | 2480 | 1984 | 260 |
| WH | 16190 | 690 | 15500 | | 15500 | 115 | 70 | 82 | 100 | 70 | 1128 |
| CN | 250 | 175 | 80 | 5 | 75 | 87 | 87 | 87 | 97 | 87 | 22 |
| CG | 6400 | 3185 | 3215 | | 3215 | 82 | 67 | 69 | 75 | 67 | 429 |
| RI | 392 | 27 | 375 | 10 | 365 | 210 | 105 | 121 | 168 | 105 | 41 |
| SB | 135 | 135 | | | | 208 | 208 | 208 | 219 | 208 | 28 |
| SM | 104 | 114 | | 10 | -10 | 184 | 184 | 184 | 230 | 184 | 19 |
| SO | 24 | 44 | | 20 | -20 | 342 | 342 | 342 | 684 | 342 | 8 |
| OS | 647 | 600 | 52 | 5 | 47 | 324 | 324 | 324 | 360 | 324 | 210 |
| OM | 264 | 259 | 5 | | 5 | 166 | 166 | 166 | 208 | 166 | 44 |
| OO | 154 | 281 | | 127 | -127 | 569 | 569 | 569 | 1138 | 569 | 88 |
| CT | 205 | 22 | 261 | 78 | 183 | 1056 | 528 | 537 | 843 | 528 | 108 |
| SU | 3404 | 546 | 2858 | | 2858 | 133 | 107 | 125 | 214 | 107 | 364 |
| TB | 11 | 22 | 1 | 12 | -11 | 3606 | 3606 | 3606 | 7212 | 3606 | 40 |

| | Subsidy Equivalent Percent | | ----------1986 Support Rates (U.S. $/Metric Ton)---------- ----Summary Support Rates--- | | | ----------Model Price Wedges---------- | | | | +----------+ Product Definition |
|---|---|---|---|---|---|---|---|---|---|---|
| | Producer | Consumer | Producer | Consumer | Market | Producer | Consumer | Export | Import | and Code Mnemonics |
| BF | 5 | | 59 | | | 59 | | | | BF BeeF, veal |
| PK | | | | | | | | | | PK PorK |
| ML | 2 | | 26 | | | 26 | | | | ML Mutton, Lamb |
| PM | | | | | | | | | | PM Poultry Meat |
| PE | | | | | | | | | | PE Poultry Eggs |
| DM | 43 | | 103 | | | 103 | | | | DM Dairy - Milk |
| DB | 15 | | 352 | | | 352 | | | | DB Dairy - Butter |
| DC | 9 | | 270 | | | 270 | | | | DC Dairy - Cheese |
| DP | 4 | | 82 | | | 82 | | | | DP Dairy - Powder |
| WH | 15 | | 12 | | | 12 | | | | WH WHeat |
| CN | | | | | | | | | | CN CorN |
| CG | 3 | | 2 | | | 2 | | | | CG o. Coarse Gr. |
| RI | 13 | | 16 | | | 16 | | | | RI RIce |
| SB | | | | | | | | | | SB SoyBeans |
| SM | | | | | | | | | | SM SoyMeal |
| SO | | | | | | | | | | SO SoyOil |
| OS | | | | | | | | | | OS Other oilSeeds |
| OM | | | | | | | | | | OM Other Meals |
| OO | | | | | | | | | | OO Other Oils |
| CT | 2 | | 9 | | | 9 | | | | CT CoTton |
| SU | 14 | | 18 | | | 18 | | | | SU SUgar |
| TB | | | | | | | | | | TB ToBacco |

Appendix table C7: New Zealand--ST86 base quantity, price, and support data

| | 1986 Quantity Data (1000 Metric Tons) | | | | | 1986 Price Data (U.S. $/Metric Ton) | | | | | Prod. V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Supply | Demand | Exports | Imports | Net Trade | World | Market | Producer | Consumer | Trade | (Mil. $) |
| BF | 466 | 126 | 340 | | 340 | 2091 | 1046 | 1150 | 1744 | 1046 | 487 |
| PK | 48 | 48 | 1 | 1 | | 2341 | 2341 | 2341 | 4682 | 2341 | 112 |
| ML | 611 | 89 | 522 | | 522 | 2030 | 1015 | 1091 | 1537 | 1015 | 620 |
| PM | 46 | 46 | | | | 1083 | 1083 | 1083 | 1969 | 1083 | 50 |
| PE | | | | | | | | | | | |
| DM | 8226 | 8226 | | | | 275 | 138 | 172 | 257 | 138 | 1131 |
| DB | 299 | 75 | 224 | | 224 | 2048 | 2048 | 2160 | 2560 | 2048 | 612 |
| DC | 127 | 36 | 91 | | 91 | 2744 | 2744 | 2813 | 3920 | 2744 | 348 |
| DP | 290 | 38 | 252 | | 252 | 1984 | 1984 | 2070 | 2480 | 1984 | 575 |
| WH | 400 | 380 | 100 | 80 | 20 | 115 | 115 | 115 | 164 | 115 | 46 |
| CN | 254 | 198 | 56 | | 56 | 87 | 87 | 87 | 97 | 87 | 22 |
| CG | 662 | 432 | 230 | | 230 | 82 | 82 | 82 | 91 | 82 | 54 |
| RI | | | | | | | | | | | |
| SB | 1 | 1 | | | | 208 | 208 | 208 | 219 | 208 | |
| SM | 1 | 4 | | 3 | -3 | 184 | 184 | 184 | 230 | 184 | |
| SO | 1 | 11 | | 10 | -10 | 342 | 342 | 342 | 684 | 342 | |
| OS | 1 | 11 | | 10 | -10 | 324 | 324 | 324 | 360 | 324 | |
| OM | 1 | 1 | | | | 166 | 166 | 166 | 208 | 166 | |
| OO | 1 | 14 | | 13 | -13 | 569 | 569 | 569 | 1138 | 569 | 1 |
| CT | | | | | | | | | | | |
| SU | 1 | 167 | | 166 | -166 | 133 | 133 | 133 | 266 | 133 | |
| TB | 2 | 6 | 1 | 5 | -4 | 3606 | 3606 | 3606 | 7212 | 3606 | 7 |

| | Subsidy Equivalent Percent | | 1986 Support Rates (U.S. $/Metric Ton) | | | | | | | Product Definition and Code Mnemonics |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Summary Support Rates | | | Model Price Wedges | | | | |
| | Producer | Consumer | Producer | Consumer | Market | Producer | Consumer | Export | Import | |
| BF | 9 | | 104 | | | 104 | | | | BF BeeF, veal |
| PK | | | | | | | | | | PK PorK |
| ML | 7 | | 76 | | | 76 | | | | ML Mutton, Lamb |
| PM | | | | | | | | | | PM Poultry Meat |
| PE | | | | | | | | | | PE Poultry Eggs |
| DM | 20 | | 34 | | | 34 | | | | DM Dairy - Milk |
| DB | 5 | | 112 | | | 112 | | | | DB Dairy - Butter |
| DC | 2 | | 69 | | | 69 | | | | DC Dairy - Cheese |
| DP | 4 | | 86 | | | 86 | | | | DP Dairy - Powder |
| WH | | | | | | | | | | WH WHeat |
| CN | | | | | | | | | | CN CorN |
| CG | | | | | | | | | | CG o. Coarse Gr. |
| RI | | | | | | | | | | RI RIce |
| SB | | | | | | | | | | SB SoyBeans |
| SM | | | | | | | | | | SM SoyMeal |
| SO | | | | | | | | | | SO SoyOil |
| OS | | | | | | | | | | OS Other oilSeeds |
| OM | | | | | | | | | | OM Other Meals |
| OO | | | | | | | | | | OO Other Oils |
| CT | | | | | | | | | | CT CoTton |
| SU | | | | | | | | | | SU SUgar |
| TB | | | | | | | | | | TB ToBacco |

Appendix table C8: Developing Country Exporters--ST86 base quantity, price, and support data

| | 1986 Quantity Data (1000 Metric Tons) | | | | | 1986 Price Data (U.S. $/Metric Ton) | | | | | Prod. V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Supply | Demand | Exports | Imports | Net Trade | World | Market | Producer | Consumer | Trade | (Mil. $) |
| BF | 4945 | 4778 | 601 | 434 | 167 | 2091 | 1986 | 1897 | 3611 | 2091 | 9822 |
| PK | 1498 | 1563 | 5 | 70 | -65 | 2341 | 2430 | 2430 | 4860 | 2341 | 3640 |
| ML | 88 | 78 | 10 | | 10 | 2030 | 2030 | 2030 | 4060 | 2030 | 179 |
| PM | 2701 | 2422 | 302 | 23 | 279 | 1083 | 1088 | 1087 | 1977 | 1083 | 2938 |
| PE | 828 | 829 | | 1 | -1 | 2145 | 2145 | 2145 | 3575 | 2145 | 1776 |
| DM | 16096 | 16096 | | | | 275 | 275 | 275 | 550 | 275 | 4426 |
| DB | 97 | 114 | | 17 | -17 | 2048 | 2269 | 2269 | 2836 | 2048 | 220 |
| DC | 441 | 465 | 8 | 32 | -24 | 2744 | 2744 | 2744 | 3920 | 2744 | 1210 |
| DP | 42 | 197 | 1 | 156 | -155 | 1984 | 1984 | 1984 | 2480 | 1984 | 83 |
| WH | 14604 | 16377 | 4467 | 6240 | -1773 | 115 | 111 | 167 | 158 | 115 | 1620 |
| CN | 49536 | 43191 | 7804 | 1459 | 6345 | 87 | 88 | 126 | 97 | 87 | 4346 |
| CG | 4728 | 3797 | 1236 | 305 | 931 | 82 | 79 | 79 | 87 | 82 | 372 |
| RI | 52397 | 48419 | 4381 | 403 | 3978 | 210 | 212 | 252 | 463 | 210 | 11115 |
| SB | 25947 | 22020 | 4852 | 925 | 3927 | 208 | 194 | 238 | 205 | 208 | 5045 |
| SM | 15306 | 4396 | 11850 | 940 | 10910 | 184 | 184 | 184 | 230 | 184 | 2816 |
| SO | 3546 | 1838 | 1813 | 105 | 1708 | 342 | 342 | 342 | 684 | 342 | 1213 |
| OS | 9418 | 9068 | 480 | 130 | 350 | 324 | 330 | 330 | 367 | 324 | 3112 |
| OM | 4230 | 1101 | 3287 | 158 | 3129 | 166 | 166 | 166 | 207 | 166 | 702 |
| OO | 10031 | 3294 | 6922 | 185 | 6737 | 569 | 546 | 546 | 1093 | 569 | 5480 |
| CT | 789 | 1307 | 86 | 604 | -518 | 1056 | 1056 | 1056 | 2112 | 1056 | 833 |
| SU | 15520 | 10876 | 5307 | 663 | 4644 | 133 | 163 | 164 | 327 | 133 | 2536 |
| TB | 640 | 408 | 271 | 39 | 232 | 3606 | 3606 | 3606 | 7212 | 3606 | 2308 |

| | Subsidy Equivalent Percent | | 1986 Support Rates (U.S. $/Metric Ton) | | | | | | | +----------+ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Summary Support Rates | | | Model Price Wedges | | | | Product Definition |
| | Producer | Consumer | Producer | Consumer | Market | Producer | Consumer | Export | Import | and Code Mnemonics |
| BF | -10 | 3 | -194 | 105 | -105 | -89 | | -105 | | BF BeeF, veal |
| PK | 4 | -2 | 89 | -89 | 89 | 89 | -89 | | | PK PorK |
| ML | | | | | | | | | | ML Mutton, Lamb |
| PM | | | 4 | -5 | 5 | | | 5 | | PM Poultry Meat |
| PE | | | | | | | | | | PE Poultry Eggs |
| DM | | | | | | | | | | DM Dairy - Milk |
| DB | 10 | -8 | 221 | -221 | 221 | | | | -221 | DB Dairy - Butter |
| DC | | | | | | | | | | DC Dairy - Cheese |
| DP | | | | | | | | | | DP Dairy - Powder |
| WH | 31 | 3 | 52 | 4 | -4 | 56 | | | 4 | WH WHeat |
| CN | 31 | | 39 | | | 39 | | | | CN CorN |
| CG | -4 | 4 | -3 | 3 | -3 | | | -3 | | CG o. Coarse Gr. |
| RI | 17 | -9 | 42 | -40 | 2 | 39 | -38 | 2 | | RI RIce |
| SB | 13 | 7 | 30 | 14 | -14 | 44 | | -14 | | SB SoyBeans |
| SM | | | | | | | | | | SM SoyMeal |
| SO | | | | | | | | | | SO SoyOil |
| OS | 2 | -2 | 6 | -6 | 6 | | | 6 | | OS Other oilSeeds |
| OM | | | | | | | | | | OM Other Meals |
| OO | -4 | 2 | -23 | 23 | -23 | | | -23 | | OO Other Oils |
| CT | | | | | | | | | | CT CoTton |
| SU | 19 | -9 | 31 | -30 | 30 | 1 | | 30 | | SU SUgar |
| TB | | | | | | | | | | TB ToBacco |

Appendix table C9: Centrally Planned Countries--ST86 base quantity, price, and support data

| | 1986 Quantity Data (1000 Metric Tons) | | | | | 1986 Price Data (U.S. $/Metric Ton) | | | | | Prod. V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Supply | Demand | Exports | Imports | Net Trade | World | Market | Producer | Consumer | Trade | (Mil. $) |
| BF | 10797 | 10858 | 319 | 380 | -61 | 2091 | 2091 | 3791 | 3305 | 2091 | 22577 |
| PK | 30661 | 30110 | 856 | 305 | 551 | 2341 | 2341 | 2259 | 4376 | 2341 | 71777 |
| ML | 1803 | 1751 | 92 | 40 | 52 | 2030 | 2030 | 2468 | 3408 | 2030 | 3660 |
| PM | 6566 | 6405 | 348 | 187 | 161 | 1083 | 1083 | 1164 | 1891 | 1083 | 7111 |
| PE | 7085 | 7024 | 91 | 30 | 61 | 2145 | 2145 | 2263 | 3575 | 2145 | 15197 |
| DM | 149249 | 149249 | 27 | 29 | | 275 | 275 | 221 | 423 | 275 | 41043 |
| DB | 2454 | 2598 | 92 | 236 | -144 | 2048 | 2048 | 4530 | 1499 | 2048 | 5026 |
| DC | 1549 | 1504 | 86 | 41 | 45 | 2744 | 2744 | 3022 | 3186 | 2744 | 4250 |
| DP | 2217 | 2095 | 133 | 11 | 122 | 1984 | 1984 | 1984 | 2480 | 1984 | 4399 |
| WH | 221925 | 248175 | 2450 | 28700 | -26250 | 115 | 115 | 99 | 127 | 115 | 25521 |
| CN | 120300 | 125800 | 6350 | 11850 | -5500 | 87 | 87 | 87 | 97 | 87 | 10466 |
| CG | 145840 | 151735 | 745 | 6640 | -5895 | 82 | 82 | 93 | 74 | 82 | 11959 |
| RI | 121714 | 121499 | 1100 | 885 | 215 | 210 | 210 | 210 | 415 | 210 | 25560 |
| SB | 13163 | 13599 | 1615 | 2051 | -436 | 208 | 208 | 210 | 207 | 208 | 2738 |
| SM | 3919 | 9149 | 1160 | 6390 | -5230 | 184 | 184 | 184 | 230 | 184 | 721 |
| SO | 697 | 1658 | 2 | 963 | -961 | 342 | 342 | 342 | 684 | 342 | 238 |
| OS | 34847 | 34228 | 1075 | 456 | 619 | 324 | 324 | 338 | 360 | 324 | 11290 |
| OM | 13114 | 12491 | 1164 | 541 | 623 | 166 | 166 | 166 | 207 | 166 | 2177 |
| OO | 7597 | 7885 | 733 | 1021 | -288 | 569 | 569 | 569 | 1138 | 569 | 4323 |
| CT | 6193 | 5759 | 1382 | 948 | 434 | 1056 | 1056 | 1065 | 1640 | 1056 | 6540 |
| SU | 19677 | 25650 | 1205 | 7178 | -5973 | 133 | 133 | 228 | 291 | 133 | 2617 |
| TB | 2247 | 2350 | 111 | 214 | -103 | 3606 | 3606 | 3606 | 7212 | 3606 | 8103 |

| | Subsidy Equivalent Percent | | 1986 Support Rates (U.S. $/Metric Ton) | | | | | | | Product Definition and Code Mnemonics |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Summary Support Rates | | | Model Price Wedges | | | | |
| | Producer | Consumer | Producer | Consumer | Market | Producer | Consumer | Export | Import | |
| BF | 45 | 15 | 1700 | 497 | | 1700 | 497 | | | BF BeeF, veal |
| PK | -4 | 7 | -82 | 306 | | -82 | 306 | | | PK PorK |
| ML | 18 | 19 | 438 | 652 | | 438 | 652 | | | ML Mutton, Lamb |
| PM | 7 | 4 | 81 | 78 | | 81 | 78 | | | PM Poultry Meat |
| PE | 5 | | 118 | | | 118 | | | | PE Poultry Eggs |
| DM | -25 | 30 | -54 | 127 | | -54 | 127 | | | DM Dairy - Milk |
| DB | 55 | 71 | 2482 | 1061 | | 2482 | 1061 | | | DB Dairy - Butter |
| DC | 9 | 23 | 278 | 734 | | 278 | 734 | | | DC Dairy - Cheese |
| DP | | | | | | | | | | DP Dairy - Powder |
| WH | -16 | 29 | -16 | 37 | | -16 | 37 | | | WH WHeat |
| CN | | | | | | | | | | CN CorN |
| CG | 12 | 23 | 11 | 17 | | 11 | 17 | | | CG o. Coarse Gr. |
| RI | | 1 | | 5 | | | 5 | | | RI RIce |
| SB | 1 | 6 | 2 | 12 | | 2 | 12 | | | SB SoyBeans |
| SM | | | | | | | | | | SM SoyMeal |
| SO | | | | | | | | | | SO SoyOil |
| OS | 4 | | 14 | | | 14 | | | | OS Other oilSeeds |
| OM | | | | | | | | | | OM Other Meals |
| OO | | | | | | | | | | OO Other Oils |
| CT | | 29 | 9 | 472 | | 9 | 472 | | | CT CoTton |
| SU | 42 | -9 | 95 | -25 | | 95 | -25 | | | SU SUgar |
| TB | | | | | | | | | | TB ToBacco |

Appendix table C10: Developing Asian Importers--ST86 base quantity, price, and support data

| | 1986 Quantity Data (1000 Metric Tons) | | | | | 1986 Price Data (U.S. $/Metric Ton) | | | | | Prod. V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Supply | Demand | Exports | Imports | Net Trade | World | Market | Producer | Consumer | Trade | (Mil. $) |
| BF | 213 | 344 | 2 | 133 | -131 | 2091 | 2091 | 4270 | 7348 | 2091 | 445 |
| PK | 1291 | 1401 | 128 | 238 | -110 | 2341 | 2341 | 2148 | 4774 | 2341 | 3022 |
| ML | 5 | 11 | 14 | 20 | -6 | 2030 | 2030 | 2030 | 4060 | 2030 | 10 |
| PM | 625 | 771 | 18 | 164 | -146 | 1083 | 1083 | 1600 | 2505 | 1083 | 677 |
| PE | 612 | 709 | 5 | 102 | -97 | 2145 | 2145 | 2170 | 3693 | 2145 | 1313 |
| DM | | | | | | | | | | | |
| DB | | | | | | | | | | | |
| DC | | | | | | | | | | | |
| DP | | | | | | | | | | | |
| WH | 8 | 5184 | 50 | 5226 | -5176 | 115 | 116 | 247 | 169 | 115 | 1 |
| CN | 424 | 8024 | | 7600 | -7600 | 87 | 87 | 149 | 97 | 87 | 37 |
| CG | 576 | 1706 | | 1130 | -1130 | 82 | 82 | 386 | 229 | 82 | 47 |
| RI | 7424 | 7807 | 197 | 580 | -383 | 210 | 210 | 811 | 986 | 210 | 1559 |
| SB | 217 | 3052 | 35 | 2870 | -2835 | 208 | 208 | 871 | 533 | 208 | 45 |
| SM | 1917 | 2266 | 36 | 385 | -349 | 184 | 184 | 184 | 230 | 184 | 353 |
| SO | 413 | 455 | 95 | 137 | -42 | 342 | 342 | 342 | 684 | 342 | 141 |
| OS | 120 | 252 | 125 | 257 | -132 | 324 | 324 | 324 | 360 | 324 | 39 |
| OM | 42 | 234 | 12 | 204 | -192 | 166 | 166 | 166 | 207 | 166 | 7 |
| OO | 40 | 483 | 596 | 1039 | -443 | 569 | 569 | 569 | 1138 | 569 | 23 |
| CT | 3 | 1197 | 59 | 1253 | -1194 | 1056 | 1056 | 1056 | 2112 | 1056 | 3 |
| SU | 606 | 1806 | 177 | 1377 | -1200 | 133 | 133 | 283 | 527 | 133 | 81 |
| TB | 79 | 83 | 30 | 34 | -4 | 3606 | 3606 | 3981 | 7212 | 3606 | 285 |

| | Subsidy Equivalent Percent | | 1986 Support Rates (U.S. $/Metric Ton) | | | | | | | Product Definition and Code Mnemonics |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Summary Support Rates | | | Model Price Wedges | | | | |
| | Producer | Consumer | Producer | Consumer | Market | Producer | Consumer | Export | Import | |
| BF | 51 | -48 | 2179 | -3546 | | 2179 | -3546 | | | BF BeeF, veal |
| PK | -9 | -2 | -193 | -92 | | -193 | -92 | | | PK PorK |
| ML | | | | | | | | | | ML Mutton, Lamb |
| PM | 32 | -21 | 517 | -536 | | 517 | -536 | | | PM Poultry Meat |
| PE | 1 | -3 | 25 | -118 | | 25 | -118 | | | PE Poultry Eggs |
| DM | | | | | | | | | | DM Dairy - Milk |
| DB | | | | | | | | | | DB Dairy - Butter |
| DC | | | | | | | | | | DC Dairy - Cheese |
| DP | | | | | | | | | | DP Dairy - Powder |
| WH | 53 | -2 | 132 | -4 | | 131 | -3 | | | WH WHeat |
| CN | 42 | | 62 | | | 62 | | | | CN CorN |
| CG | 79 | -60 | 304 | -138 | | 304 | -138 | | | CG o. Coarse Gr. |
| RI | 74 | -57 | 601 | -566 | | 601 | -566 | | | RI RIce |
| SB | 76 | -59 | 663 | -314 | | 663 | -314 | | | SB SoyBeans |
| SM | | | | | | | | | | SM SoyMeal |
| SO | | | | | | | | | | SO SoyOil |
| OS | | | | | | | | | | OS Other oilSeeds |
| OM | | | | | | | | | | OM Other Meals |
| OO | | | | | | | | | | OO Other Oils |
| CT | | | | | | | | | | CT CoTton |
| SU | 53 | -50 | 150 | -261 | | 150 | -261 | | | SU SUgar |
| TB | 9 | | 375 | | | 375 | | | | TB ToBacco |

Appendix table C11: Other Developing Country Importers--ST86 base quantity, price, and support data

| | -----1986 Quantity Data (1000 Metric Tons)---- | | | | | -----1986 Price Data (U.S. $/Metric Ton)----- | | | | | Prod. V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Supply | Demand | Exports | Imports | Net Trade | World | Market | Producer | Consumer | Trade | (Mil. $) |
| BF | 4732 | 5661 | 324 | 1253 | -929 | 2091 | 1960 | 2102 | 3693 | 2091 | 9273 |
| PK | 1465 | 1504 | | 39 | -39 | 2341 | 2341 | 2341 | 4682 | 2341 | 3430 |
| ML | 1442 | 1856 | 63 | 490 | -414 | 2030 | 2030 | 1912 | 3959 | 2030 | 2927 |
| PM | 3717 | 4322 | 39 | 644 | -605 | 1083 | 1083 | 1135 | 2015 | 1083 | 4026 |
| PE | 3801 | 3704 | 153 | 56 | 97 | 2145 | 2145 | 2145 | 3575 | 2145 | 8153 |
| DM | 65398 | 65398 | 218 | 40 | | 275 | 268 | 229 | 497 | 275 | 17494 |
| DB | 938 | 1293 | | 355 | -355 | 2048 | 2368 | 2368 | 2960 | 2048 | 2221 |
| DC | 878 | 1161 | 8 | 291 | -283 | 2744 | 2747 | 2747 | 3925 | 2744 | 2412 |
| DP | 325 | 1204 | 103 | 982 | -879 | 1984 | 2023 | 2023 | 2528 | 1984 | 657 |
| WH | 110543 | 150029 | 1808 | 41294 | -39486 | 115 | 115 | 92 | 142 | 115 | 12710 |
| CN | 61939 | 76198 | 2640 | 16899 | -14259 | 87 | 91 | 110 | 90 | 87 | 5645 |
| CG | 71828 | 84055 | 1343 | 13570 | -12227 | 82 | 82 | 85 | 89 | 82 | 5913 |
| RI | 117613 | 123877 | 2795 | 9059 | -6264 | 210 | 210 | 201 | 439 | 210 | 24728 |
| SB | 3925 | 6605 | 908 | 3588 | -2680 | 208 | 217 | 230 | 200 | 208 | 850 |
| SM | 4373 | 6518 | 1372 | 3517 | -2145 | 184 | 184 | 184 | 230 | 184 | 805 |
| SO | 899 | 3006 | 91 | 2198 | -2107 | 342 | 358 | 358 | 716 | 342 | 322 |
| OS | 29154 | 29563 | 500 | 909 | -409 | 324 | 328 | 330 | 364 | 324 | 9563 |
| OM | 11175 | 9896 | 1498 | 219 | 1279 | 166 | 159 | 159 | 199 | 166 | 1781 |
| OO | 8971 | 12728 | 1243 | 5000 | -3757 | 569 | 635 | 635 | 1270 | 569 | 5697 |
| CT | 5768 | 4078 | 2266 | 576 | 1690 | 1056 | 1030 | 1038 | 1995 | 1056 | 5942 |
| SU | 37676 | 35517 | 12350 | 10191 | 2159 | 133 | 133 | 171 | 314 | 133 | 5017 |
| TB | 1375 | 1108 | 425 | 158 | 267 | 3606 | 3606 | 3606 | 7212 | 3606 | 4958 |

| | Subsidy Equivalent | | ----------1986 Support Rates (U.S. $/Metric Ton)---------- | | | | | | | +----------+ |
|---|---|---|---|---|---|---|---|---|---|---|
| | Percent | | ----Summary Support Rates--- | | | ----------Model Price Wedges---------- | | | | Product Definition |
| | Producer | Consumer | Producer | Consumer | Market | Producer | Consumer | Export | Import | and Code Mnemonics |
| BF | | | 11 | 1 | -131 | 142 | -130 | | 131 | BF BeeF, veal |
| PK | | | | | | | | | | PK PorK |
| ML | -6 | . 3 | -118 | 101 | | -118 | 101 | | | ML Mutton, Lamb |
| PM | 5 | -2 | 52 | -46 | | 52 | -46 | | | PM Poultry Meat |
| PE | | | | | | | | | | PE Poultry Eggs |
| DM | -20 | 9 | -46 | 46 | -7 | -46 | 46 | | | DM Dairy - Milk |
| DB | 14 | -11 | 320 | -320 | 320 | 320 | -320 | | | DB Dairy - Butter |
| DC | | | 3 | -3 | 3 | 3 | -3 | | | DC Dairy - Cheese |
| DP | 2 | -2 | 39 | -39 | 39 | 39 | -39 | | | DP Dairy - Powder |
| WH | -25 | 15 | -23 | 22 | | -23 | 22 | | | WH WHeat |
| CN | 21 | 8 | 23 | 7 | 4 | 22 | 8 | | | CN CorN |
| CG | 4 | 2 | 3 | 2 | | 3 | 2 | | | CG o. Coarse Gr. |
| RI | -4 | -4 | -9 | -19 | | -9 | -19 | | | RI RIce |
| SB | 10 | 10 | 22 | 20 | 9 | 18 | 24 | | -4 | SB SoyBeans |
| SM | | | | | | | | | | SM SoyMeal |
| SO | 4 | -2 | 16 | -16 | 16 | | | | -16 | SO SoyOil |
| OS | 2 | -1 | 6 | -4 | 4 | 10 | -8 | | 4 | OS Other oilSeeds |
| OM | -4 | 3 | -7 | 7 | -7 | | | -7 | | OM Other Meals |
| OO | 10 | -5 | 66 | -66 | 66 | 14 | -14 | | -52 | OO Other Oils |
| CT | -2 | 5 | -18 | 92 | -26 | -12 | 85 | -6 | | CT CoTton |
| SU | 22 | -15 | 38 | -48 | | 38 | -47 | | | SU SUgar |
| TB | | | | | | | | | | TB ToBacco |

## Appendix D--Initialization in ST86

Initialization is a modeling procedure that determines the shape and location of the supply and demand curves, and in the process, replicates the prices and quantities produced, consumed, and traded in the base year. It indicates the existence of a reference solution and requires three types of basic data: initial quantities produced, consumed, and traded; initial prices to which consumers, producers, and traders respond, and price elasticities of supply and demand.

Data on quantities are generally robust and are normally not a source of concern during initialization. The most notable point about the ST86 quantity data is that demand includes stock changes. This is necessary because ST86 does not model stocks and requires that net trade equals supply minus demand. Thus, the model implicitly assumes that normal stock to consumption ratios will prevail.

Far less certainty, however, exists regarding the choice of appropriate elasticities and prices, and a lot more attention is usually devoted to these data during initialization. Because issues concerning elasticities have been addressed elsewhere (Gardiner, Liu, and Roningen, 1989), the discussion in this appendix will focus on price initialization only.

The price at which the supply quantity is initialized in ST86 is called the producer incentive price. The producer incentive price is defined as the border (trade) price adjusted for the full per unit value of the producer subsidy equivalent (PSE) and all known marketing margins between the producer and the farm gate. Because our source of policy data (USDA, 1988), however, does not always explicitly report border prices, we generally derive the border prices at the producer level by adjusting USDA's market price at the producer level by the market price support component of their PSE (Appendix C). The producer incentive price in this case is the sum of the derived trade price and the per unit PSE. Margins are not explicitly added under this approach because the market price at the producer level is assumed to incorporate the spread between the border and producer prices. Where data on border prices and market prices are not available, the producer incentive price is derived using the world reference price.

Deriving consumer incentive prices is even more complicated. Because consumer prices reported in (USDA, 1988) are at different levels of the marketing chain, the prices are not strictly comparable either across commodities or countries. From a modeling perspective, this means that the consumer prices reported in (USDA, 1988) may not necessarily be compatible either with the definition of PSE's and CSE's or the quantity data which is often cited at the producer level. To maintain an element of consistency among the price, quantity, elasticity, and policy data set, we constructed consumer incentive prices based on the derived trade price at the producer level, the consumer subsidy equivalent (CSE), and the marketing margin between the producer level market price and the retail prices. The producer to retail margin, a fixed ratio, for each commodity is assumed to be identical across countries and is derived from historical U.S. spreads (table D1).

In practice, it is usually not possible to find a series of prices across the production-consumption-trade chain for many commodities and countries. There-

Table D1--Assumed market price share of consumption price

| Commodity | Price |
|---|---|
| Beef & veal, and poultry meat | 0.55 |
| Pork, mutton & lamb, dairy - milk, rice, soyoil, other oils, cotton, sugar, and tobacco | .50 |
| Poultry eggs | .60 |
| Dairy - butter, dairy - powder, soymeal, and other meals | .80 |
| Dairy - cheese and wheat | .70 |
| Corn, other coarse grains, and other oilseeds | .90 |
| Soybeans | .95 |

fore, we selected a hierarchy of prices for initialization via formal relationships. We selected an observed market price first. If that was unavailable, we used an observed consumer price. If that was unavailable, another price was chosen, and so on. All other prices required in the ST86 model were derived from the selected observed price, support information, the assumed producer-consumer marketing spread, and the formal relationships. The order of hierarchy of selection for the observed price was: the market price, the consumer price, the trade price, and finally the world reference price.

Formally, the producer and consumer incentive prices are related as follows:

PSE = producer subsidy equivalent,
CSE = consumer subsidy equivalent,
MPS = market price support component of both PSE and CSE (tariffs, quotas)
PIP = producer incentive price,
CIP = consumer incentive price,
MKP = market price at producer level,
TPP = trade price at producer level,
WRP = world reference price,

s = ratio of market price at producer level to consumer price (table D1) (= MKP/CIP), and
MA = fixed margin between MKP and CIP; MA = (1-s)*CIP.

Given the PSE, CSE, MPS, MKP, the producer and consumer incentive prices and the derived trade prices are

TPP = MKP - MPS,
PIP = TPP + PSE, and
CIP = TPP - CSE + MA.

## Appendix E--Supply Controls in ST86

Countries like the United States and Japan have programs that require that farmers idle a portion of their land to qualify for price and income supports. Because the producer subsidy equivalents, as presently calculated, do not include forgone income due to policies that control supply, they, in effect, exclude some of the production-offsetting element of policies. Therefore, liberalizing agricultural policies requires not only reducing PSE's, but also relaxing supply controls at the same time.

Figure E1 illustrates the case of supply controls. With no income and price support, the producer faces price PF and produces QF. With price and income supports (per unit PSE = PS-PF), he produces QS because the support inclusive price is PS. If a supply control scheme is imposed requiring a cutback in production to QA from QS, then he produces QA with incentive price PS. Our model is initialized at the observed quantity of QA with an incentive price of PS.

The key analytical issue when eliminating all support to agriculture is to locate the supply curve that would be expected in the absence of supply controls, that is, to determine the magnitude of the shift (LM) in the observed supply curve S1 in figure E1. The shift represents the cutback in production induced by supply control requirements. The cutback in production depends on three parameters: the amount of land that was required to be taken out of production, the average yield on cropped land, and the "slippage" coefficient. Slippage describes the situation where the effectiveness of acreage reduction programs on production is less than the number of idle acres would suggest. Slippage occurs either because average yields on cropped land would be lower without government programs (yield slippage) or because government programs tend to draw more land into production than would otherwise be cultivated (acreage slippage). Details on the concepts can be found in (Ericksen and Collins, 1985).

**Figure E1**

**Set-asides in ST86**

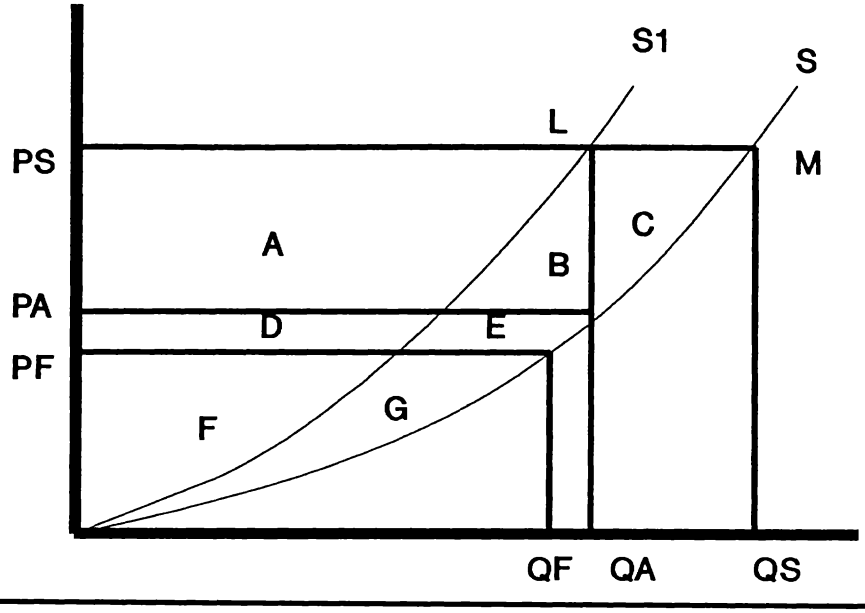

Table E1--Acreage, yield, and production slippages in ST86

| Commodity | Yield | Acreage | Production |
|---|---|---|---|
| Wheat | 0.06 | 0.25 | 0.44 |
| Corn | .03 | .39 | .56 |
| Sorghum | .03 | .42 | .59 |
| Rice | .09 | .24 | .43 |
| Cotton | .02 | .37 | .42 |

Source: (11)

While information on the amount of land taken out of production and average yields are readily available, much less is known about the slippage coefficients. At one extreme, we could assume a situation of no slippage. In this case, the amount of shift (LM) would be the production forgone on idled land taking into account only the proportion of idled acres that would be harvested and average yields.

The agricultural economics literature (Tweeten, 1979), however, seems to suggest that slippage does occur when government programs are in existence. A review of the literature indicates that average yields on cropped land would be lower without government programs because: productivity on diverted land is lower than productivity on land actually cropped (Weisgerber, 1969), and there is a substitution of other inputs for land because government programs lower price risks faced by producers. Table E1 presents the yield slippage coefficients used in our modeling exercise for the United States. The estimates range from 0.02 for cotton to 0.09 for rice. In other words, if set-aside requirements did not exist, average yields on cropped land would be 9 percent lower for rice and 2 percent lower for cotton.

The literature also suggests that not all diverted acres would return to crop production. The estimates we use in our model imply that less than two-thirds of the acres diverted under the corn and cotton programs would return to production. The acreage slippage coefficients are smaller for wheat (0.25) and rice (0.24), nearly 3 of 4 acres set aside would come back into production.

Production slippage, the ratio of expected reduction in production to actual reduction in production, is derived from yield and acreage slippage coefficients. The coefficients in table E1 suggest that cutbacks in production induced by supply controls would be 40-60 percent less than what would be expected if no slippages were assumed. This means that the shift in the supply curve in figure E1 (LM) would be different depending on our assumptions on slippage. The two situations, no slippage vis-a-vis slippage based on empirical econometric estimates, could be interpreted to define the extremes on the location of the conjectural supply curve if production controls are relaxed.

The gains and losses to producers from supply controls can also be seen in figure E1. If price and income support are accompanied by supply controls, then the initial producer welfare could be represented either by area A+D,

assuming that land of average quality is withdrawn from production, or area A+B+D+F+G+E assuming that producers withdraw the most unproductive land from production ((Haley, 1989) and (Haley and Dixit, 1988)). If, in contrast, supply controls were not necessary to qualify for support, then the initial producer welfare would be represented by area A+D+F+B+C+E+G. This means that supply control requirements impose a cost of either area B+C+E+G or area C on producers. In our modeling exercise, the additional cost of supply control is represented by area C, implying that we assume that producers idle their most unproductive land to fulfill government set-aside requirements.

A final note on PSE's, supply controls, and our modeling exercise. Since PSE's reported in (USDA, 1988) do not incorporate costs of required supply control associated with farm programs, such as acreage reduction programs in the United States and the paddy-field reorientation program in Japan, such policies are incorporated directly into the model as volume shifters. An alternative means of handling such policies would be to adjust the PSE's by an implied tax on producers and initialize the model at the observed quantity of QA (fig. E1) with an incentive price of PA. The adjusted PSE's, under those circumstances, would be more representative of the trade-distorting effects of support. Details on alternative methods of modeling production control are provided in (Haley, 1989).

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